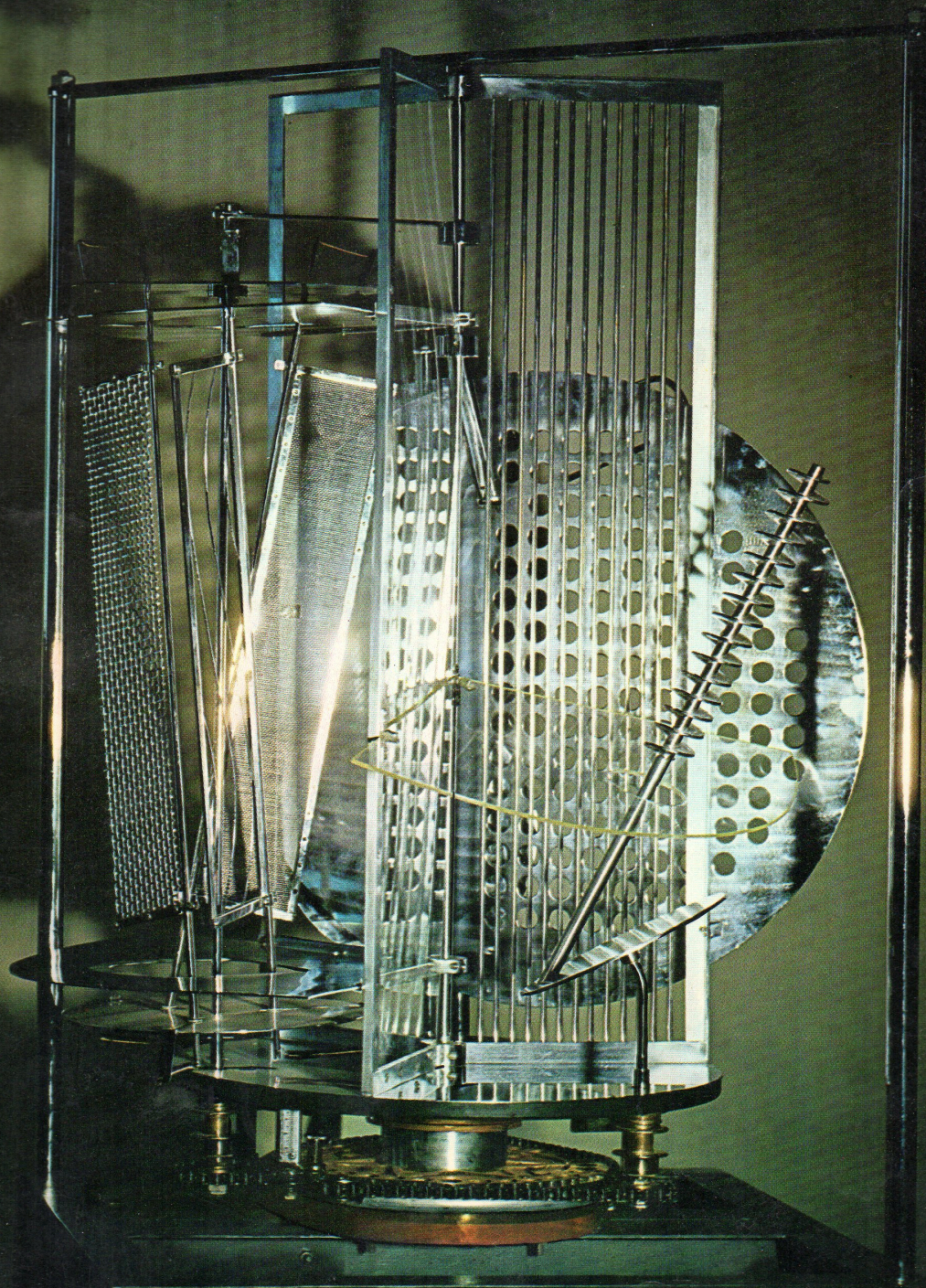


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LIGHT ART

A growing number of contemporary artists use real light as their dominant medium of expression. The survey on the following pages investigates how they use it, why they use it and who some of their predecessors in light art were

Nan R. Piene



Whatever the source—sun, fire or electricity—all art depends on light for lighting. However, in certain eras, artists have been attracted to light for its own sake. Some results of this attraction are the atmospheric illusionism in Pompeian murals, the glittering, reflective surfaces of Byzantine mosaics, the mysterious yet radiant filtering of sunlight through Gothic cathedral windows. In European painting, a strong attraction to light can be seen in Masaccio's subtle staging, Grünewald's prismatic expressionism and Leonardo's sfumato.

The Baroque era was intrigued by light in a complex way, from the rippling sun-and-shadow facades of its buildings and the elaborately flickering chandeliers of its mirrored ballrooms to Caravaggio's dramatically illuminated flesh, Vermeer's coolly sensual sunshafts, Rembrandt's chiaroscuro, La Tour's candles and El Greco's electric storm over Toledo.

Turner painted a maximum of light obscured by a minimum of matter; his contemporary, Goethe, whose extensive light and color studies Turner read, spent an immense amount of energy trying to refute Newton's optical research of the previous century. The impressionists broke up painted light into dancing dots of pigment, causing the canvas to seem to vibrate. When their immediate successor, Seurat, depicted sunlight with points of pigment in contrasting colors, he relied on the physiological optics research of the early-nineteenth-century chemist Chevreul. Seurat knew that colors mixed by the viewer's retina would have more luminosity than broad patches of pigment, and he called his work "*peinture optique*."

The subject of this article is the growing number of artists of today, as well as some of their early-twentieth-century predecessors, whose major concern is neither light as lighting, nor the

representation of light, but the articulation of light itself. Light—usually electrically powered light but sometimes sunlight, firelight and other kinds of chemically created light—is their expressive medium, in the sense that pigment, cast bronze, plexiglas and marble are media.

Light, which may be defined as the vision-producing part of the electromagnetic spectrum, is a *form of energy*. One explanation of why recently many artists have been drawn to using light as a medium is that, as a form of energy, light has a more direct impact on the viewer's senses than traditional media.

Not surprisingly, in addition to artists' one-man shows and demonstrations, a number of group exhibitions have been organized recently to show contemporary artists' interest in light. By far the largest and most comprehensive of these, "Kunst-Licht-Kunst," took place last fall at the Stedelijk van Abbe Museum in Eindhoven, Holland. Earlier in 1966 there were smaller, interesting light shows in the United States, at Harvard's Carpenter Center for the Visual Arts, at the Addison Gallery of American Art in Andover, Massachusetts, and at the Institute of Contemporary Art in Houston. The Finch College Art Museum in New York and the Institute of Contemporary Art in Boston put on shows last December devoted chiefly to films but also including several light environments. In February, the Howard Wise Gallery in New York had a large show consisting mostly of light art objects, and on April 8 the Walker Art Center in Minneapolis opened a show of objects and demonstrations, "Light-Motion-Space," that will last until May 21. On May 20, at the New Jersey State Museum in Trenton, "Focus on Light" opens for the summer; this show will be concerned both with the representation of light on canvas in nineteenth- and twentieth-century painting and with contemporary art objects employing electric light. In addition to these shows, there have been in the past six years numerous kinetic sculpture exhibitions that included light art objects; some of these kinetic exhibitions stressed the theme of light and motion.

(continued on page 26)

Dan Flavin: "greens crossing greens" (to Piet Mondrian who lacked green), green fluorescent tubing and frosted translucent plastic, 1966. Temporary installation for Kunst-Licht-Kunst, Stedelijk van Abbe Museum, Eindhoven, Holland. Photo by Rolf Schroeter.

Avant-garde Dreamers and Doers

"... Dorothy walked boldly through and found herself in a wonderful place. It was a big, round room with a high arched roof, and the walls and ceiling and floor were covered with large emeralds set closely together. In the center of the roof was a great light, as bright as the sun, which made the emeralds sparkle in a wonderful manner."

—L. Frank Baum,
"The Wonderful Wizard of Oz," 1900.

The light artists of today, some of whom began using light in the 1950s and some of whom began employing light one, two or three years ago, owe almost nothing to the handful of individuals who earlier in the century either made or dreamed of making creative works with light. That is, there seems to be no particular historical development based on knowledge of previous work, as there is in the history of modern painting.

Most, although not all, of what one could now call the historical figures of light art were visionaries who were not concerned with museum or living room art but instead were involved in architecture and display design, still photography and movies, music and theater. One of their initial stimulæ was certainly the popularization of electric light that got underway in the 1880s, following Edison's invention in 1879 of a practical incandescent filament lamp.

The most fantastic visionary of all was Paul Scheerbart (1863–1915), an eccentric German novelist whose satirical, science-fictionlike folk tales proposed that the look of the future include controlled displays of artificial stars in the stratosphere. In "The Emperor of Utopia" (1904) Scheerbart wrote of aerial cities to be lifted into the air by balloons, "... there to ascend and descend continuously in interesting combinations, thus displaying the charms of a mobile architecture." The cities were to be "illuminated ... from above and below by a thousand colored spotlights ... flickering about like flashes of light sparkling from gigantic diamonds."

In 1914, the architect Bruno Taut dedicated to Scheerbart his startling contribution to the Cologne Werkbund exhibition: a dome-shaped lattice of reinforced concrete ribs made stable by vari-colored glass panels, with a curved staircase of Luxfer prisms which refracted light against the glass walls. In the same year the Der Sturm group published Scheerbart's book "Glasarchitektur," a non-fiction work, dedicated to Taut, in which Scheerbart envisioned, among other things, railways tracking colored lights across the night countryside, Zeppelins blazing



colored searchlights onto Alpine peaks and brightly lit motorboats zooming past glass waterfront buildings. His attraction to glass as a building material seemed based on its qualities as a conductor and reflector of light. The architectural historian Reyner Banham suggests that Scheerbart's ideas were almost certainly well known to Taut's friend, Walter Gropius, when he was recruiting some of the first Bauhaus staff from the Der Sturm circle.

Lyonel Feininger's 1919 woodcut for the cover of the first Weimar Bauhaus proclamation shows a cathedral-like building surmounted by stars shooting giant light beams in every direction. Certainly in post-World War I Germany there was a strong if not passionate interest in the creative possibilities of light and the Bauhaus classes did a great deal of experimenting with light.

Oskar Schlemmer's stage workshop at the Bauhaus emphasized the importance of the human body in performance by, among other means, upgrading the role of light from both its use as mere lighting and its use in film-projected backdrops. A theater was a place where spaces should be dematerialized with changing forms, colors and lights, Schlemmer believed. There were experiments and dance performances with shadow play, large projected moving shapes of light and reflection.

Two of Schlemmer's students, Ludwig Hirshfeld-Mack and Kurt Schwerdtfeger, in 1922 developed slightly varying versions of what they called "reflected light plays." These, accompanied by music and viewed from the front of a dark cloth screen, were moving colored projections of changing abstract geometric shapes which were directed onto the back of the screen. The effect is said to have been similar to that achieved in the abstract animated black-and-white films "Rhythmus 21" and "Diagonal Symphony," made one year earlier in Berlin by Hans Richter and Viking Eggeling.

Herbert Bayer, who taught the Bauhaus typography workshop, developed several display design projects that emphasized light; the most interesting of these was an exhibition pavilion he proposed in 1924. It was to be in the form of a revolving sphere completely covered with electric bulbs which formed letters in various colors.

Laszlo Moholy-Nagy, the Hungarian artist (1895–1946) whom Gropius enlisted to teach at the Bauhaus in 1923, was more intensely involved than anyone else at the school in research on light, and he continued his researches at the Institute of Design ("the New Bauhaus") he founded in Chicago in 1937. Early in the 1920s Moholy wrote that light would bring forth a new form of visual art. It is impossible to describe here all the aspects of his ideas on and projects with light. There were extensive experi-

Goethe made the woodcut opposite for his "Optical Essays," in 1792. It shows his eye triumphing over various Newtonian instruments such as the prism, which Goethe hated because he believed light could not be broken up into colors but was instead a homogeneous, indivisible substance. Despite this mistake, Goethe made many valuable observations about light in "Essays" and in his "Color Theory" (1803).

ments in photography and its cameraless brother, the photogram (which he "reinvented" in the same early 1920s period when Man Ray, working in Paris, shone light on objects lying on photosensitive paper and called the printed result "Rayographs"). More pertinent to light art, perhaps, was his metal and glass motorized sculpture, *Lichtrequisit* (Light Prop) of 1922–30.

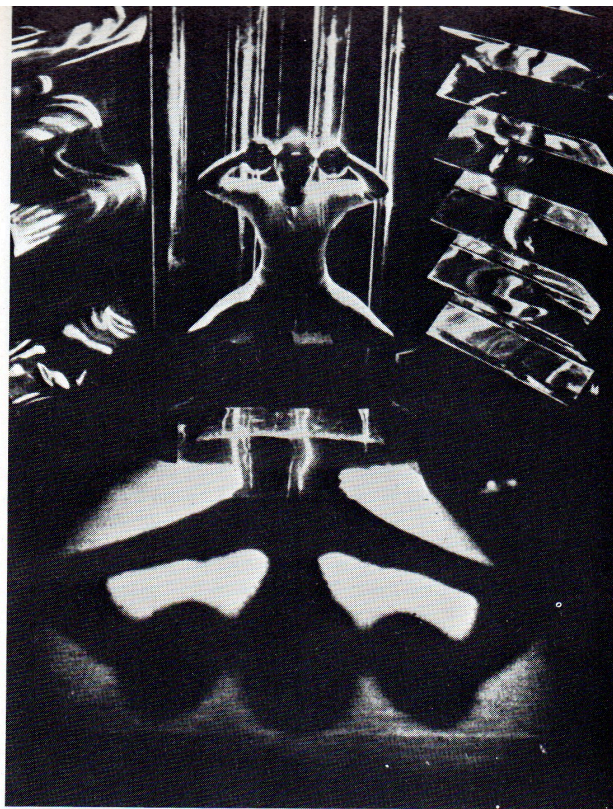
This sculpture, which in his books Moholy alternately describes as a "light display machine," a potential stage prop and an "apparatus for painting with light," was recently rechromed to appear last fall at the "Kunst-Licht-Kunst" show in Eindhoven, Holland. There it revolved in front of one spotlight and cast shadow patterns onto nearby walls. One of Moholy's ways to use it was to put it inside a box where more than 100 variously colored bulbs, attached by drum contact to the motor of the sculpture, flashed in a two-minute cycle. The sixth part—the only one ever filmed—of Moholy's film synopsis "Light Display, Black and White and Gray" used the *Lichtrequisit* as its subject. The brief synopsis (reprinted on page 29) strikingly demonstrates the farsightedness of Moholy as a visionary as well as practicing and researching light artist.

Moholy's compatriot, friend and colleague at the New Bauhaus, the artist Gyorgy Kepes, who is currently a professor at the Massachusetts Institute of Technology, has maintained and added to the Moholy tradition of imaginative teaching and practical research into light as an art medium. In January 1966, Kepes mounted the exhibition "Light as a Creative Medium" at Harvard's Carpenter Center. It showed subtle uses of light throughout art history, a number of works by younger contemporary light artists and a group of M.I.T. student exercises with photography, stroboscopic light, reflecting metallic surfaces, polaroid screens and diffraction gratings.

Kepes' most intense and specific dream regarding light in art today is to see artificial light used creatively and on a great scale in the night cityscape. "A mere pocket of space, such as a room in a home or a hall in a museum," he wrote recently, "is suffocatingly small for the fluid power of light in action."

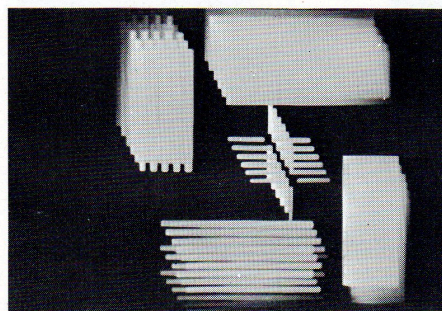
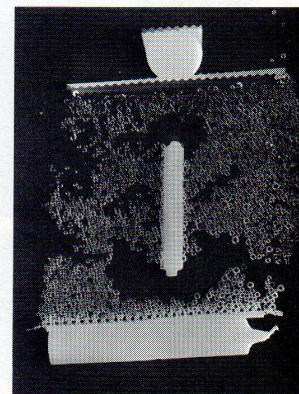
The Danish-born American Thomas Wilfred (b. 1889), one of the first deliberate creators of light art, noted wryly in a 1947 article that although the existence of a physical relation between music intervals and the colors of the spectrum had been disproved, "color music" or light organs "still pop out at least once a year as a brand new idea." He was right, and today the fact that sound impulses from a record or tape can, with the help of a fairly simple electronic device, be used to switch lights on and off has not stopped the flow.

As long ago as 1734, Father Louis-Bertrand Castel, a French



"Metal Dance," a production of Oskar Schlemmer's stagecraft workshop in 1928–29 at the Dessau Bauhaus.

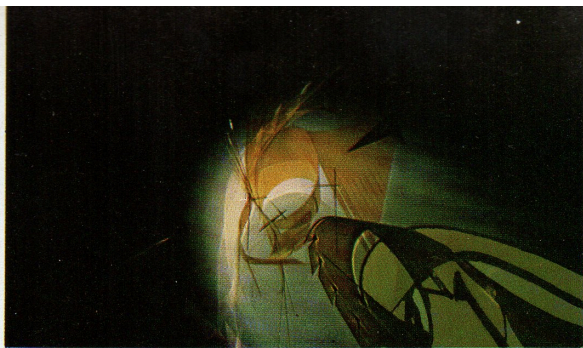
Man Ray: Untitled Rayograph, photosensitive paper, 1928. Collection of Mr. and Mrs. Man Ray.



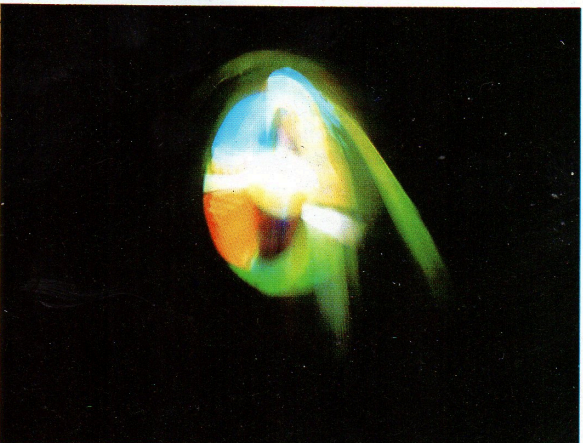
Ludwig Hirshfeld-Mack: one image from "Reflected Light Play," 1922, a Bauhaus apparatus that projected changing colored abstract images from behind onto a screen.



Hans Richter: frame from 1921 black-and-white abstract animated film "Rhythmus 21."



Above, James Davis' *Light Reflections*, a mobile of mirrored acetate and translucent colored plastic, spotlighted to create moving projections on a nearby wall, 1942-66. Below, three moments in Thomas Wilfred's *Lumia Suite*, Opus 158, 1964, composed for his "Clavilux," a silent keyboard that rear-projects moving light forms through filters and reflectors onto a screen; commissioned by the Museum of Modern Art, New York, Mrs. Solomon R. Guggenheim Fund.



Jesuit philosopher and mathematician, was inspired by a line in Newton's "Optics" to rebuild his harpsichord into the first color organ, which he named the "Clavecin Oculaire." When Father Castel pressed a key, a strip of colored silk (for example, blue for C, yellow-orange for F, and so on, quite arbitrarily assigned) unrolled in front of one of several candles nearby. Alexander Wallace Rimington, an art professor at Queen's College in London, unveiled in 1895 a similar device, made from an organ and arc lights which projected onto a heavy white drape. He, like Father Castel, arbitrarily assigned different notes to different colors, and his organ was soundless, the music being played simultaneously by a second performer on a conventional organ.

It was Rimington's scheme, although not his color-note relationship, that the Russian composer Alexander Scriabin adapted when he included in his score of "Prometheus: the Poem of Fire, Opus 60" a part for a "Tastiera per Luce" (light keyboard). The only time "Prometheus" was actually performed with the Tastiera was in 1915 at Carnegie Hall; a Rimingtonlike color organ supplied by an electric company projected colored lights onto a screen onstage. Scriabin was not present and seems to have had little or nothing to do with the arrangements; it is said he wanted the whole hall covered with changing colored light.

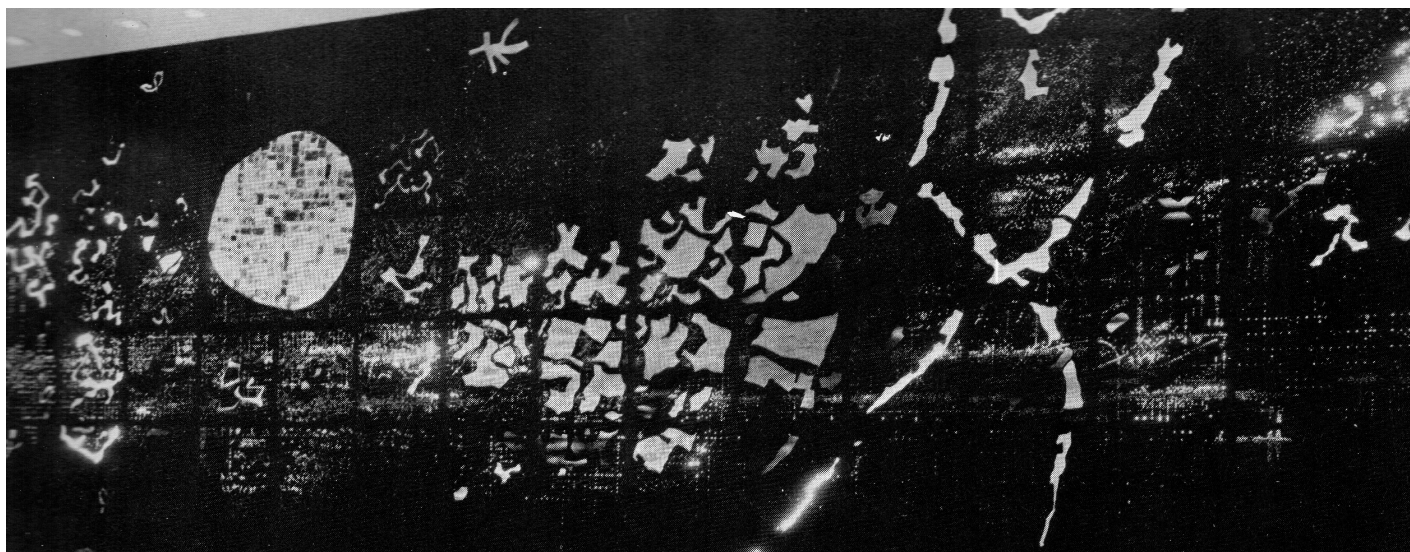
As an art student in Paris shortly before World War I, Thomas Wilfred experimented with a few wooden boxes, lenses, incandescent lights and a bedsheet screen, supporting himself by giving folk song and lute concerts. He dreamed about "an eighth art in which the artist's sole means of expression is light." In 1921, in New York, he completed his first Clavilux, a silent keyboard instrument which, when played, activated colored light projections from behind onto a rectangular white screen in a dark room. Absolutely no relation between musical notes and the varying colored light forms was intended.

Wilfred has worked on perfecting what he calls the "art of lumia" ever since. In 1930, for this purpose, he founded the Art Institute of Light, which is now in West Nyack, New York, where he lives. There he writes specific compositions to be played on sophisticated versions of the first Clavilux, that is, versions in which lenses, reflectors and other devices increase the complexity of the rate, form and color-coupling of the projected light images. The compositions that Wilfred and his disciples such as Christian Sidenius (b. 1924, American) write, establish certain themes involving the shapes of the light images and the direction in which these shapes move on the screen. The themes may not repeat in exactly the same way, as to color, intensity and rate of movement, for long cycles; in one composition the duration of the cycle is estimated to be 5,000 years.

The Museum of Modern Art in New York purchased its first lumia composition and instrument in 1942. Its third, largest and latest, *Lumia Suite*, Opus 158, acquired three years ago, was scored for Wilfred's keyboard Clavilux but is played, in its permanent, theaterlike installation in the museum, by an electronic attachment. Opus 158 has three movements; that is, forms first move horizontally, then vertically, then elliptically, the whole composition silently repeating these themes—although not in exactly the same way—every thirty-six minutes.

Variations of keyboard instruments that projected light and, unlike Wilfred's, played music, continued to appear in the 1920s, among them an "Optophone" by the German "dadasophe" Raoul Hausmann and a device with turning disks of semitransparent collage by a Russian, W. Baronoff-Rossiné. One of the most recent, and like Wilfred's a silent instrument, was built by the Hungarian-born French artist Nicholas Schoeffer (b. 1912) in 1960. The images it projects behind a screen over its organ resemble what an *art informel* painting might look like if its images moved.

(continued on page 30)



Gyorgy Kepes: Light Mural, executed in 1959 for the New York office of KLM (Royal Dutch Airlines).

A complex moving program of spotlights, fluorescent tubes and incandescent lights—suggesting night flights over cities—appears through translucent color-filtered perforations in a painted aluminum screen.

LIGHT DISPLAY, BLACK AND WHITE AND GRAY

Laszlo Moholy-Nagy, 1928–31.

[Only one part of this film synopsis was ever produced: the final scene (Part VI), which starred Lichtrequisit (Light Prop), probably the earliest light sculpture and the subject of this issue's cover.—Ed.]

I

Large quantities of matches are thrown on a metal sheet, glowing at white heat. They light nearly at once with little explosions.

Lightning.

Pyre.

Scenes with candle light; with kerosene light; with gas light; with electric light; carbide; incandescent light; magnesium torch.

The manufacture of an electric light bulb.

Spotlights. Fresnel lens distortions.

Light crosses sky. Lightning.

Light in motion. Iris diaphragm closing—opening; spiral moving; large apertures, closing-opening; masks moving, snapping.

Lights at night. Clouds, moving, dissolving, reappearing.

Play of searchlight beams.

Lighted boats at night, fishing with carbide lanterns, fastened to their bows.

Airplanes in the night.

Tracer bullets.

Car drives along a highway in deep snow. The road is lit up by headlights; relief effects of light and shadow; textures.

Snowdrift.

Moonlight, shadow of twigs on hills and mounds.

Street at night with neon signs. Light spots receding and advancing, articulating space. Wet asphalt surfaces; puddles with reflections and mirror effects.

II

Smelting mill. Glowing molten steel.

Casting; rain of sparks.

Fireworks at a fair. Magnesium balls. Merry-go-round at night.

A lighthouse.

The wings of a windmill lighted up. Gyration.

Waterfalls by night, illuminated. *Grands eaux*, Versailles.

Virtual volumes. Luminous sticks in different color moving and rotating on various planes producing glowing arabesques. Prisms multiply and a mirror doubles the scenes. The same scenes distorted by concave mirrors, reflected in motion by convex-concave (ferrotype) mirror upon a white wall.

III

Theater, Opera. The light equipment. Rehearsal; details of backstage. The bridge.

Film studio. An artist's studio.

The making of a photogram.

IV

A metal workshop where the different parts of the Light Prop are made.

Vise; lathe; sandpaper belt; disk revolving.

Glass blowing workshop. The glass parts of the Light Prop.

A glass spiral is twisted. Glass grinder grinds segments.

The production of parts made of plastic and of wire mesh.

Assembling of the Light Prop.

Motor; electrical contact; cogwheel transmission; colored bulbs.

Flashes.

V

A play of stencils for the Light Prop; perforated metal sheets, grills, grates, etc.

Play of balls (sorting machine). Small ball bearings are thrown on a nickel sheet, from there they fall through a small hole drilled in the center of a vertical partition.

Mechanical toys with great variety of the mechanism in motion.

VI

The shadow of the rotating Light Prop.

The superimposition of metal details with the shadows. The shadow revolving; slowly the shadow of a ball surrounded by strong light, moving up and down over the original shadow.

The Light Prop turns; it is seen from above, below, frontwards, backwards; in normal, accelerated, retarded, reversed motion.

Close-up of details.

A big black shiny ball rolls from left to right. From right to left. Over again.

Positive, negative pictures, fades, prisms; dissolving.

Movements, queerly shifting grills.

"Drunken" screens, lattices.

Views through small openings; through automatically changing diaphragms.

Distortion of reflections. Pendulum.

Blinding moving light flashes. Revolving spiral, reappearing, again and again. Rotation increases; all concrete shapes dissolve in light.

Plugged-in Painting

"... abstract painting can be understood as an arrested, frozen phase of kinetic light display leading back to the original emotional, sensuous meaning of color of which William Turner (1775-1851), the great English painter, was an admirable predecessor." —Laszlo Moholy-Nagy, *"Vision in Motion,"* 1946.

A large number of artists who recently began to work with light are, intentionally or not, working along lines that have an important connection to painting. That is, they are making works with predetermined perimeters, usually rectangular, which the viewer is intended to look at frontally. Except for the facts that they must be plugged in and need to have their incandescent bulbs or fluorescent tubes changed occasionally and that they do not need external illumination, many of these can be treated just like "normal" paintings.

One group of the frontally confronted light works are, like Thomas Wilfred's, filmless moving pictures projecting from behind onto some kind of screen—frosted glass, black glass, translucent cloth, etc. Some, like Wilfred's, can be greatly varied if someone manipulates controls; others, like Wilfred's electronically played pieces, have set, timed programs of form, color and movement of varying duration and complexity.

One artist making works of the former kind, really another soundless light organ, is Livinus van der Bundt (b. 1909, Dutch), a former painter and printmaker who calls his technique "dynamic photo-painting." A machine he exhibited at the Eindhoven light show contained fluorescent tubes projecting onto a screen through colored gel and prisms (to produce colors) and strips of marked or cutout transparent tape, photoslides and reflectors (to produce forms), all hooked up electronically to a keyboard by which the picture is controlled. It can be operated manually or set like a player piano. The parts and filters involved in making the abstract changing projections were encased in a large box behind the screen, about four times as long as the screen was wide. Possibly because fluorescent light (a better diffuser than projector) and some polaroid filters (which, like the sunglasses, cut glare) were used, the abstract color images were not very intense.

Sandu Darie (b. 1908, Rumania, now Cuban) uses uncomplicated means to arrange moving tableaux behind a freestanding screen about eight feet square. Lights projecting behind motorized sculptures built of wood scrap, photo transparencies of real (in one case, a portrait of Erasmus) and abstract images, moving colored gels, etc., make a collage of shadow and light forms on the screen. The viewer can change the slides and colors by pushing buttons.

Three former engineers, John Healey (b. 1894, English), who first showed his work three years ago; Frank Malina (b. 1912, American, living in Paris), who worked in the aerospace industry before becoming an artist in the mid-1950s; and Earl Reiback (b. 1936, American); and a sculptor, Abraham Palatnik (b. 1928, Brazilian), all create abstract, cyclical moving pictures that appear on the screens of fairly shallow boxes. All project light a limited distance through various kinds of intercepting filters and/or reflectors that partly determine the shape and color of the appearing forms. In some cases the interceptors are motorized, in some the light sources move, too.

Robert Breer (b. 1926, American), a sculptor and film-maker whose interest in light relates mostly to its use as a tool to articulate very rapid or very slow movement, and Nam June Paik (b. 1932, Korean, living in U.S. and Europe), a composer of electronic music, make two very different kinds of moving pictures in boxes. Breer presents his abstract animated films by running

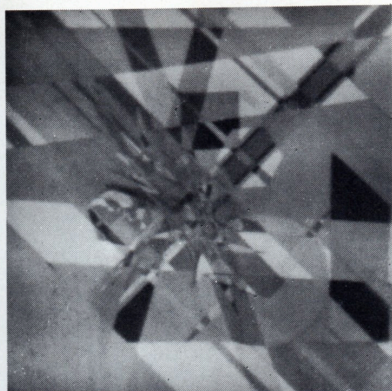
Most works opposite are shallow boxes, opaque on all sides except the front views illustrated here. All but one were shown at the autumn 1966 Kunst-Licht-Kunst exhibition at the Stedelijk van Abbe Museum, Eindhoven, Holland. (1) In Livinus van der Bundt's Chronopeinture 50 B 3, 1965, polaroid is one material used for the color-giving, cyclically moving filters through which fluorescent light shines from behind. (2) John Healey's Box 7, 1964 (detail shown here), projects incandescent light through colorless, moving, reflecting filters onto a black screen. In (3) Hugo Demarco's Structure Lumière, 1966, (4) Yaacov Agam's Tableau Lumière, 1956, (5) Gregorio Vardanega's Architecture Electronique, 1965, (6) Horacio Garcia-Rossi's 1963 box and (7) Martha Boto's Polivision Lumineuse, 1964, back lights are timed to go on and off in ways that stress flashing or twinkling movement. (8) With Manfredo Massironi's Photo Reflection Variable #3, 1962-63, the viewer changes the image of nine clear bulb filaments by tilting two one-way mirrors. (9) Gerhard von Graevenitz's Lichtobjekt, 1965, uses revolving polished metal strips to cast side light across an unscreened background. (10) Sandu Darie's Cosmorama, 1962-66, is an 8-foot-square portable shadow play and rear-projection theater where a predominantly abstract showbill changes often. (11) Composition No. 11, 1963, by Angel Duarte of the now disbanded Equipo 57 group, is a graphic scratched through black-coated glass and lit from behind. (12) In Nam June Paik's black-and-white TV set, shown in 1965 at the Galeria Bonino, New York, the inner circuits have been manipulated so that the incoming picture can be variously distorted with a magnet.

them through an endless-loop rear projector installed in a box. Recently, to remove the hard edge of the box frame and extend the picture radially, he showed a new film, "66," in a box whose front screen was surmounted by a reflecting aluminum funnel with a large hole at the apex.

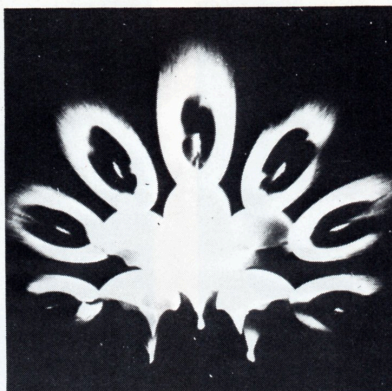
Despite an expressed desire to play the "Moonlight Sonata" on the moon, Paik has no special interest in light per se. He simply uses it when he rearranges the inner circuits of black-and-white and color television sets. The sets are equipped with a magnet, which the viewer can move to distort the electromagnetic program waves and thus, of course, the picture itself.

Unlike most of those just described, in which the movement is somewhat soft and flowing, there is another sort of frontally approached kinetic light box, which brings to mind Mondrian's *Broadway Boogie Woogie* or paintings by Max Bill or Vasarely set in motion. The movement in these boxes is rather abrupt or staccato, often traveling in straight lines or simply flashing; the screen, if there is one, is often entirely or partly clear glass, encouraging the viewer to observe, inside, geometrically arranged shapes or filters or perforated screens, through which lights are going on and off.

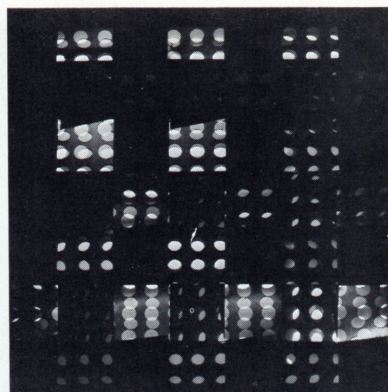
Among the artists who recently made work in this vein are: Yaacov Agam (b. 1928, Israeli), Enzo Mari (b. 1932, Italian), Hugo Demarco (b. 1932, Argentinian, living in France), Martha Boto (b. 1925, Argentinian, living in Paris) and her husband, Gregorio Vardanega (b. 1923, Italian), Preston McClanahan (b. 1933, American), Milan Dobes (b. 1929, Czechoslovakian), Ernest Trova (b. 1927, American), Karl Gerstner (b. 1930, Swiss), Steve Willats (b. 1943, English), W. Soya (b. 1927, Danish), Angel Duarte (b. 1930, Spanish, of the now-disbanded group, Equipo 57); and, from the Paris-based Groupe de Recherche d'Art Visuel, Horacio Garcia-Rossi (b. 1929, Argentinian), Joël Stein (b.



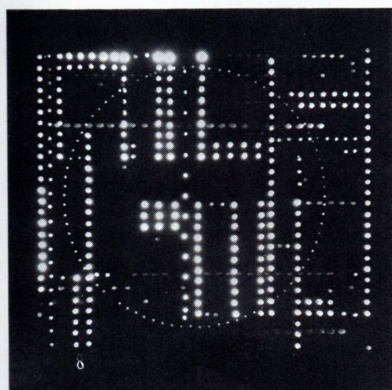
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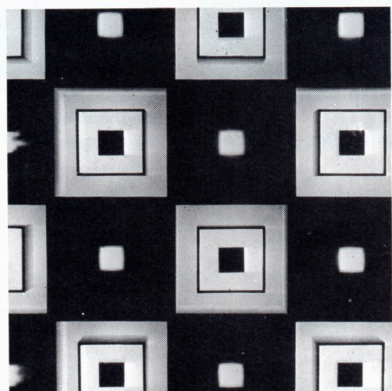
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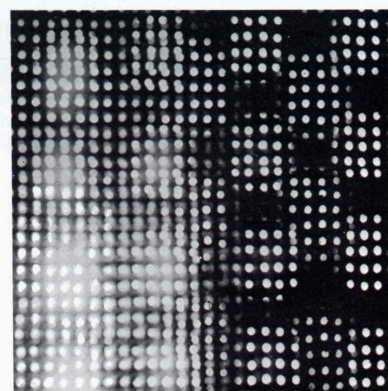
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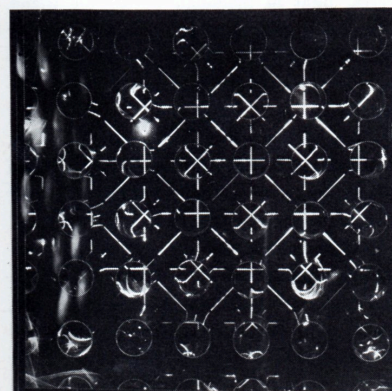
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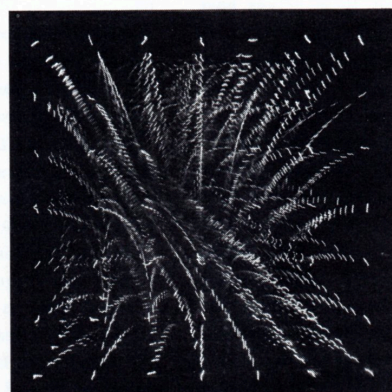
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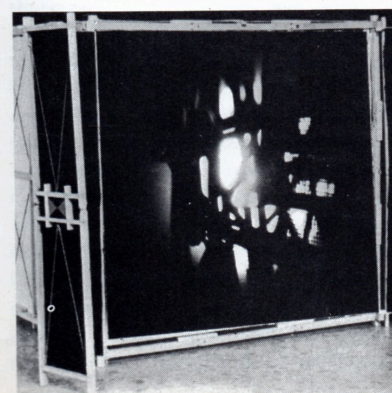
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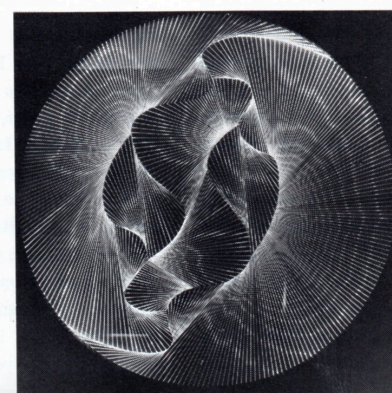
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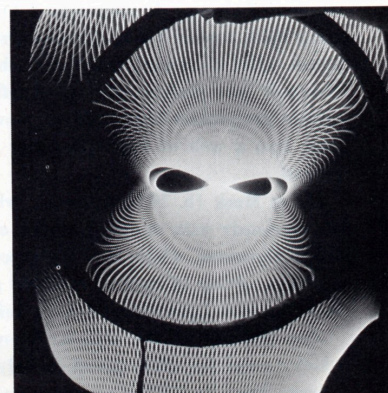
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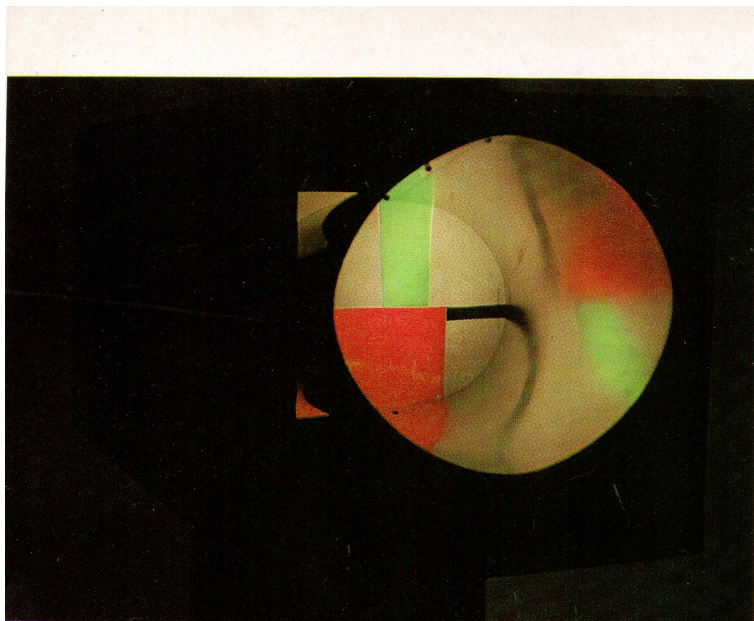
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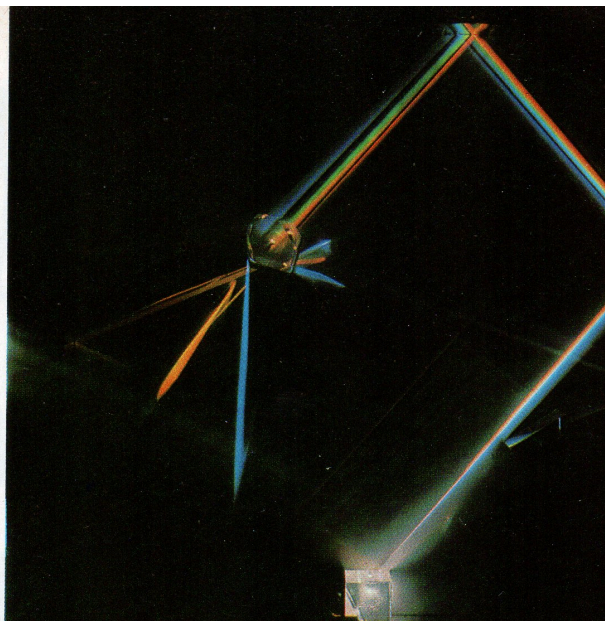
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Robert Breer: "66," a boxed animated film run with an endless-loop rear projector onto a screen bordered by a reflecting aluminum cone, 1966-67. Galeria Bonino, New York.



Alberto Biasi: *Kinetic Spectral Net*, revolving prisms and side light projected through slits, in an open box, 1963. Photo by Rolf Schroeter.

1926, French), François Morellet (b. 1926, French), and Francisco Sobrino (b. 1933, Spanish). Many of these artists have moved from an interest in constructivism and the vibration effects of optical paintings and reliefs to a concern with actual movement. This led them to use light as a means to show movement; in some cases they have developed an interest in light itself.

Americans making pieces with a less neo-constructivist appearance include John Willenbecker (b. 1936) and Thomas Tadlock (b. 1941). Although each makes boxes with abstract light images, both achieve an effect close to pop: Willenbecker with metallic paint and cool, lampshadelike globes around his lights; Tadlock with Beatle and Rolling Stone records, which provide the sound impulses that generate his jukebox-color lights. Another American, Howard Jones (b. 1922), also evokes suggestions of pop with his light pieces. These are boxes, sometimes monochrome, sometimes with a painted human silhouette, mounted with rows of bulbs programmed to flash on and off.

Julio Le Pare (b. 1928, Argentinian, living in Paris) is the member of Groupe de Recherche d'Art Visuel most inventive in using light. Among his light works are a series of similar frontal pieces called *Continuel-lumières*. Each is a flat, circular ground "framed" by a shallow cylinder of reflecting metal; the cylinder catches projections from a hidden, moving light source and turns them into a web of light lines that spiral across the circular ground.

Heinz Mack (b. 1931, German), who has worked extensively and variously with the phenomenon of reflections, makes boxes called *Dynamos*, which essentially consist of round aluminum reliefs revolving in back of a ribbed glass screen; they depend on an exterior light source to show reflection in motion.

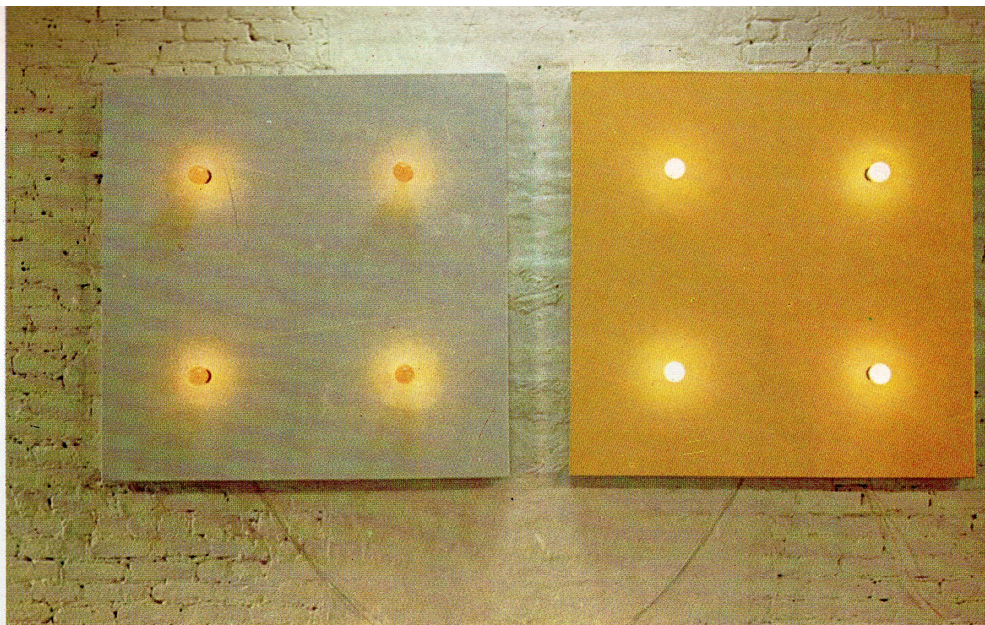
Two members of the Italian Gruppo N make boxed objects which depend for effect almost entirely on aspects of light itself. Alberto Biasi (b. 1937) projects several small, hidden side lights

through prisms revolving slowly on a rectangular board, casting moving shafts of spectral light in diagonals across the plane. Manfredo Massironi (b. 1937) places tilttable sets of one-way mirrors in front of rows of clear bulbs in such a way that only the bulbs' filaments are visible, in different deeply receding patterns as the mirrors are tilted.

To make his *Light Wall*, Gerhard von Graevenitz (b. 1934, German) shines side light through slits onto a mural-size board dotted with motorized, polished metal rotors, which in turn cast interweaving reflections and lines onto the board.

Several painters use artificial light in combination with canvases. They frequently get more direct impact than the artists who put light in boxes, and often they get more intensity of, among other effects, shape and color, than painters who handle the canvas more traditionally. Some very casual examples are the partially painted bulbs that appeared on some of Robert Rauschenberg's paintings and the back-lit translucent plastic sections of some of Tom Wesselmann's pop reliefs.

Chryssa (b. 1933, in Greece, now American) edged her paintings with strips of neon before she began free-standing neon sculptures. Dan Flavin (b. 1933, American) did the same with bulbs on shallow constructions. In addition to using a lot of fluorescent paint, Martial Raysse (b. 1936, French) uses neon light outlines of forms on his *nouveau réaliste* canvases to achieve "bottled-up movement," a mass-produced look and a vibrant glow. Robert Watts (b. 1923, American) very frequently makes pop reliefs in neon. Ben Berns (b. 1936, Dutch, living in New York) lines up a sparse number of yellow or red or blue bug lights on a blank or pale monochrome canvas, literally letting the light do the painting. Although the means are simple to the point of triviality, the effect is nuanced and pure. Gerald Oster (b. 1918, American) uses paint that shines in the dark for limited periods on his op canvases.



Ben Berns: *No. 13, canvas and buglights*, 1966. Collection of the artist.

Light-receiving and Light-giving Sculptures

"Light is a raw material, as stone or pigment, that may be processed by the artist for better or worse."

—Preston McClanahan, 1966.

"A black EAT came to mind and in order to elevate it to the spirit of the occasion it became an electric EAT, flashing its imperative with real energy. Too much so for the Fair officials who turned it off the very first day it was lit, and there it hung for two summers viewed by millions of people, but emasculated and tame."

—Robert Indiana, 1966.

"Neon . . . gives the sculpture its own existence, its own heartbeat, like a living organism."

—Billy Apple, 1966.

Light sculptures fall into two very general categories: those that are made to receive light and those which give it out. The former are familiar from the sun-catching surfaces of Rodin bronzes and the transparent curves of Gabo's space constructions.

In 1942, the painter James Davis (b. 1901, American) decided that trying to express movement on canvas with paint was "non-sense" and "obsolete." He began making transparent and translucent constructions that were not unlike Gabo's, only he used colored plastics, hung the objects from the ceiling and set them in motion with air currents or a twirl. He regarded the pieces not so much as sculptures but rather as tools for the creation of moving murals. The mural effect was achieved by shining strong spotlights through the translucent mobiles onto a nearby wall. The resulting "picture" was part projection, part reflection

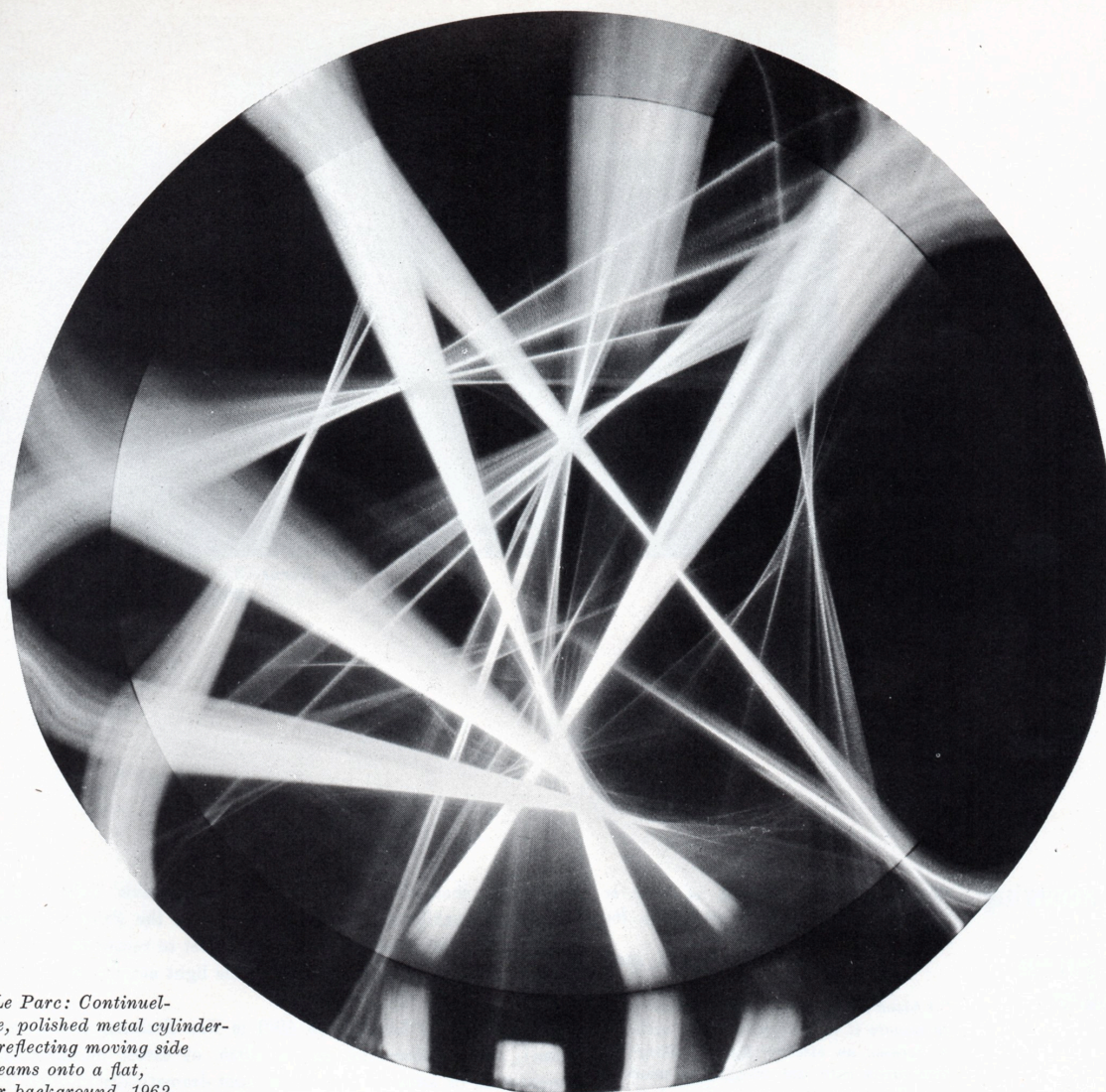
and part shadow. Occasionally groups of Davis' light objects have been exhibited; the first time was at the Howard Putzel Gallery in New York in 1945. In an effort to record the murals, Davis began making color films of the light activity his objects produced.

More recently Len Lye (b. 1901 in New Zealand, now American), whose pioneering use, in 1935, of direct painting and scratching on celluloid articulated light dramatically in films, has made motorized stainless steel sculptures that derive life and nuance from the spotlight they catch as they twirl. Heinz Mack's families of vertical aluminum stelae are relieved, polished and/or covered with zigzags of transparent plastic so as to catch and bounce a maximum amount of light. The water-filled, transparent plastic constructions of Gyula Kosice (b. 1924 in Hungary, now Argentinian) depend on exterior light and, occasionally, on their own interior bulbs or neon pipes to illuminate water in shimmering motion.

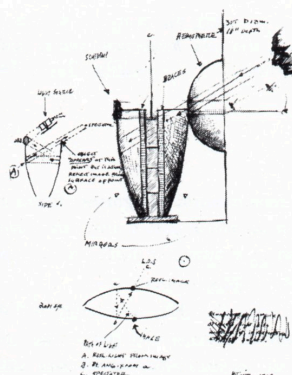
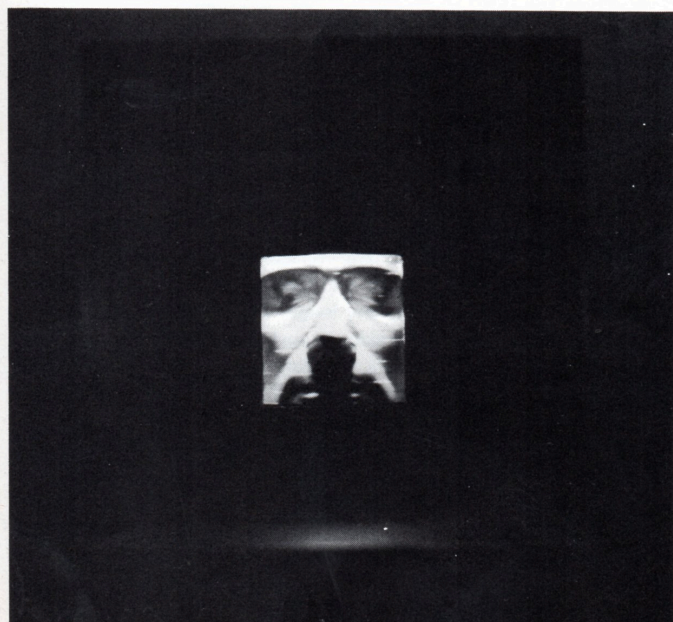
The sculptures of Nicholas Schoeffel, operating on the same principle as Moholy's *Lichtrequisit*, only usually in room-size spaces instead of inside a box, both receive and, to a limited degree, send light. They are abstract geometric constructions of highly polished metal, motorized—sometimes at several points—to revolve very rapidly. On the floor around the sculptures Schoeffel places strong projector lamps, often covered by colored theatrical gels; these lamps shine on and through the sculptures' lattices as the sculptures turn, throwing moving shadows of the sculptures onto walls and spectators and causing colored light to reflect off the polished metal surfaces.

The electronic sculpture sets (in the sense of wireless sets, television sets, etc.) of James Seawright (b. 1936, American) depend on both received and internal light: an environmental light change, produced, for example, by a viewer's stepping in the path of an incoming light source, triggers electric eyes which

(continued on page 38)



Julio Le Parc: Continuel-lumière, polished metal cylinder-frame reflecting moving side light beams onto a flat, circular background, 1962. Howard Wise Gallery, New York.

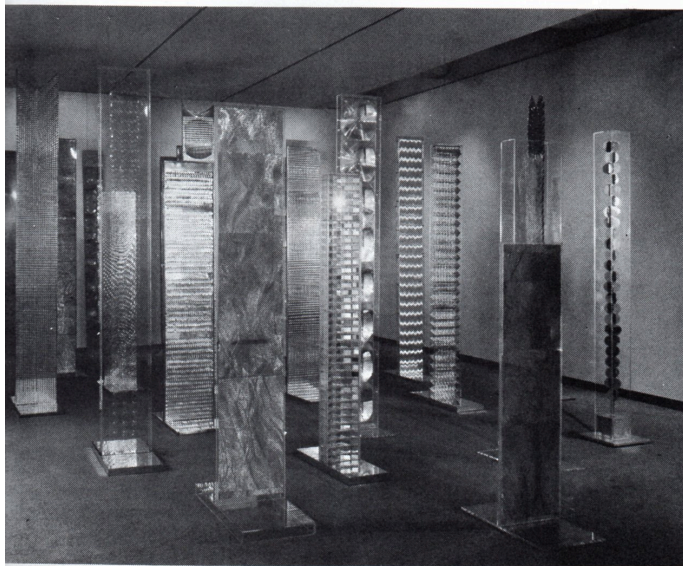


Harold Tovish: Eclipse, 1965. A seemingly touchable 3-D sculpture slowly appears and disappears from an opening in a large black box. The sculpture is actually immaterial, projected from inside the box by means of parabolic mirrors. The system can be studied in Tovish's working drawing, above.

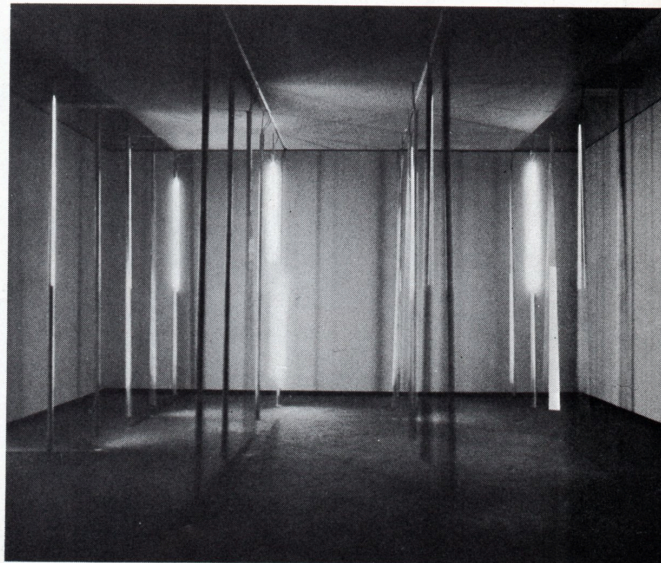
Lucio Fontana: Spatial Ambiance, for entrance salon of the 1951-52 Milan Triennale, 900 feet of neon piping.

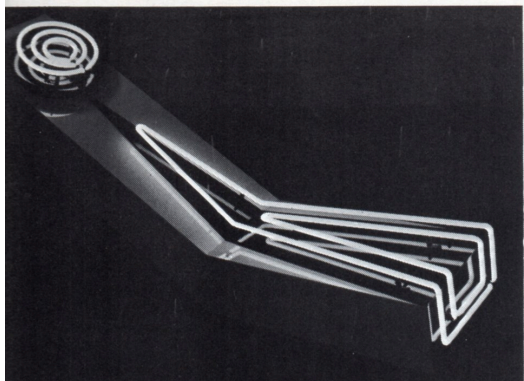


Heinz Mack: Light Forest, aluminum relief, plexiglas, water and mirror, 1966. Howard Wise Gallery, New York.

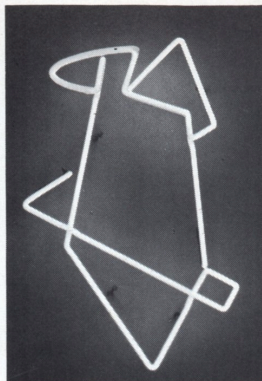


Günther Uecker: Light Rain, suspended aluminum rods containing fluorescent tubes, programmed to go on and off in cycles, 1966. Howard Wise Gallery, New York.

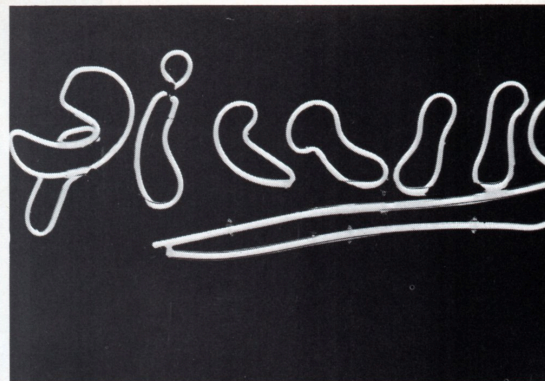




Victor Millonzi: Reclining Blue, neon and plexiglas, 1966. Collection of the artist.

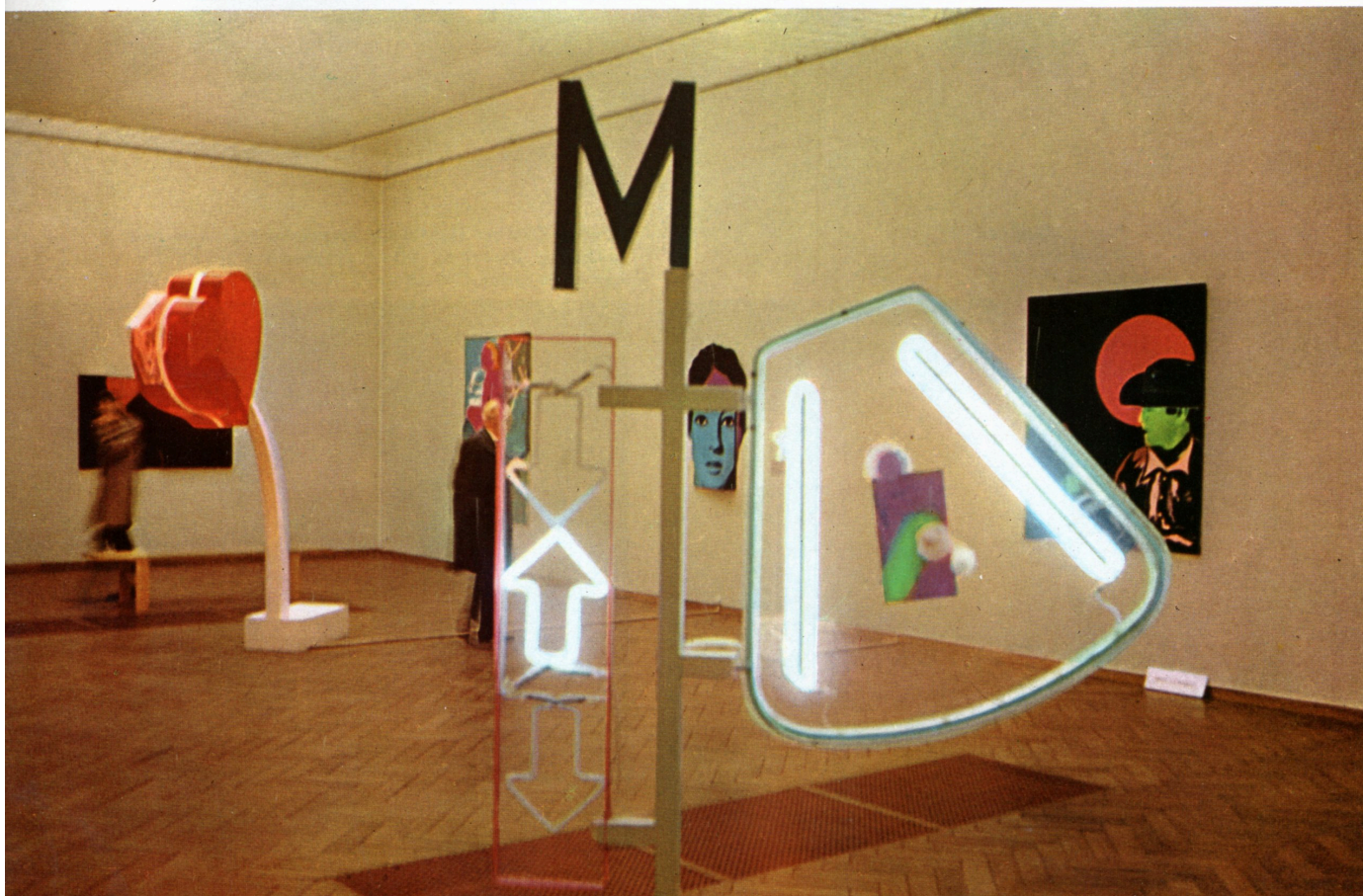


Gyula Kosice: Light Relief, neon, 1948. Terry Dintenfuss Gallery, New York.

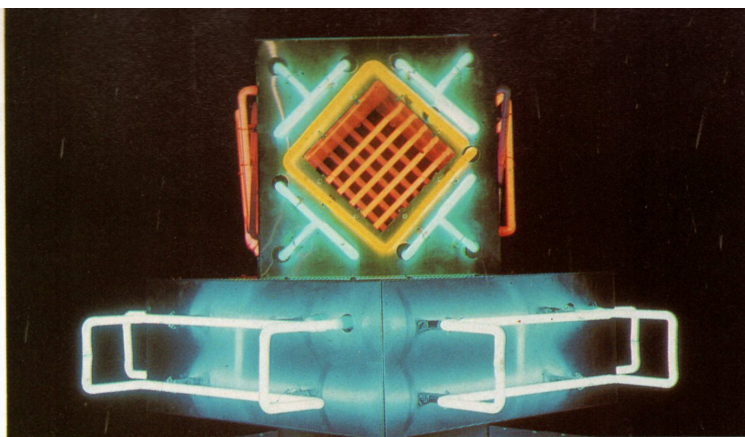


Robert Watts: Picasso Signature, neon on plastic, 1964. Bianchini Gallery, New York.

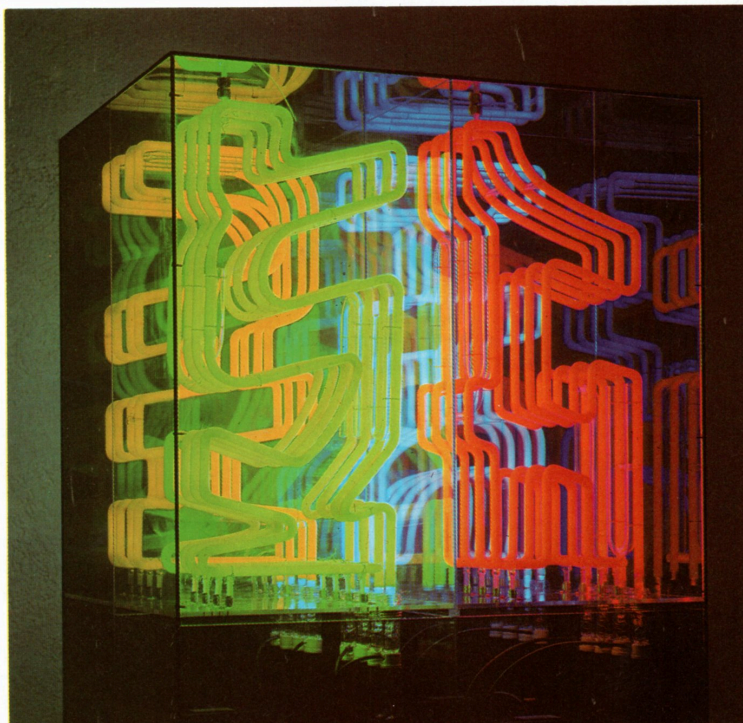
Martial Raysse: Installation at his 1965 retrospective, Stedelijk Museum, Amsterdam; in foreground, J'M France, neon with metal supports. Courtesy Alexander Iolas Gallery, Paris.



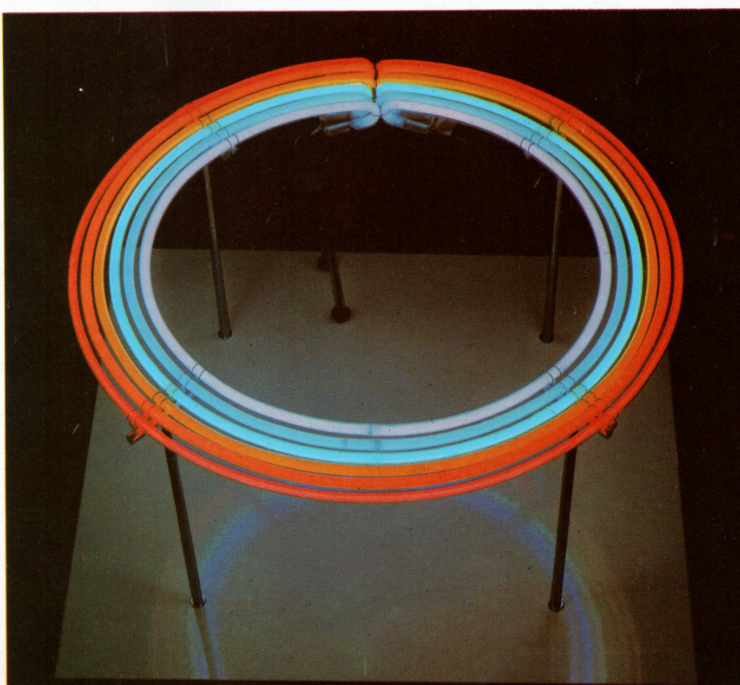
*Stephen Antonakos: Marie's Second
Neon, programmed neon, 1965.
Fischbach Gallery, New York.*

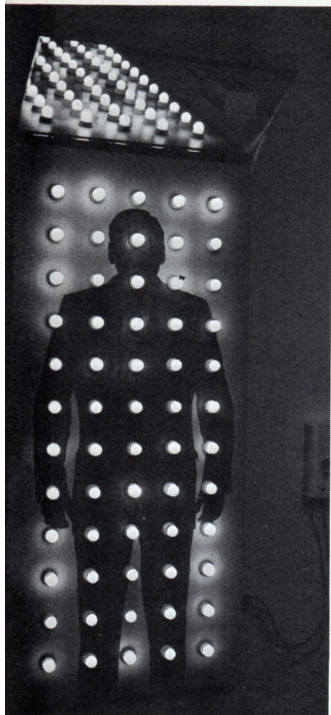


*Chryssa: Fragments for the Gates to
Times Square II, programmed
neon and plexiglas, 1966. Whitney
Museum of American Art, New York.
Courtesy Pace Gallery, New York.*



*Billy Apple: Round Table Motif,
neon, 1965. Collection of the
artist. Photo by Rolf Schroeter.*

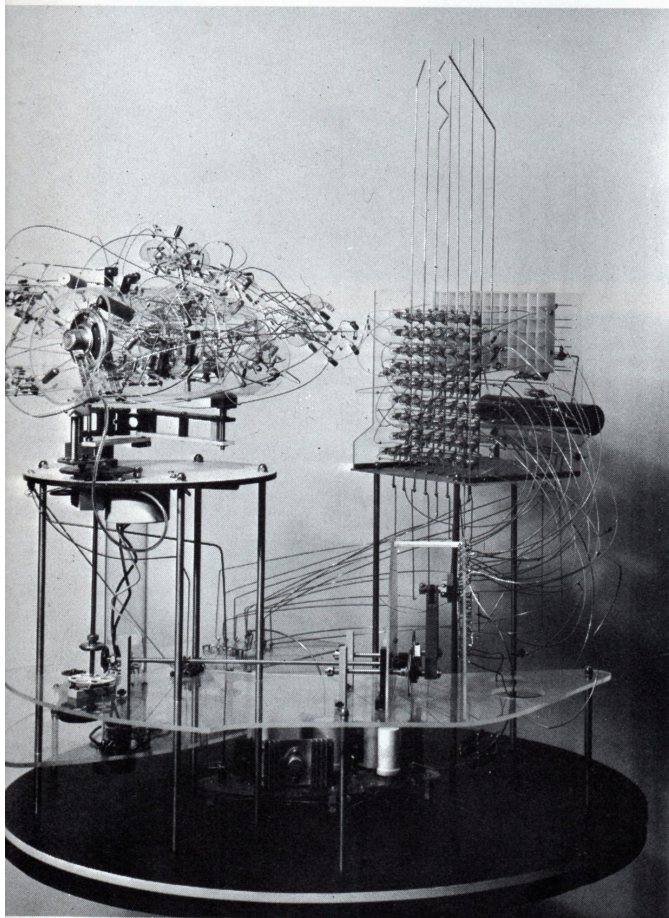




Robert Indiana: EAT, steel, enamel and programmed electric light, 1964. Stable Gallery, New York.

Howard Jones: Solo Two, lacquered wood, mirror, programmed light and sound, 1966. Royal Marks Gallery, New York.

James Seawright: Watcher, metal, plastic, electric lights and composite electronic parts, 1966. Private collection. Courtesy Stable Gallery, New York.



in turn set off varying patterns of sound and the sculpture's own bulbs. Then the bulbs sensitize other electric eyes (or, to be precise, photoelectric cells) which generate further pattern changes of sound and light, and so on.

A sculptor who frequently kineticizes his pieces with magnets, Takis (b. 1925, Greek), is also intrigued by the ancient role of lights as beacons; his recent works employing light are as modest technically as Seawright's are complicated. Each, quite simply, consists of two or three tall, swaying poles with headlike tops containing gently if ominously flashing colored lights.

Two sculptors have recently utilized the effect produced by cool light seen through a slit: Robert Morris (b. 1931, American), in a low, circular, fiberglass piece composed of two semicircular sections that secrete light at their points of nearly joining; and Günther Uecker (b. 1930, German), whose characteristic white-painted nail reliefs depend on exterior light for casting changing fields of shadows. In several man-high steel nails and in groups of standing or hanging steel poles, Uecker has hidden fluorescent tubes that blink on and off in random sequence through narrow vertical openings.

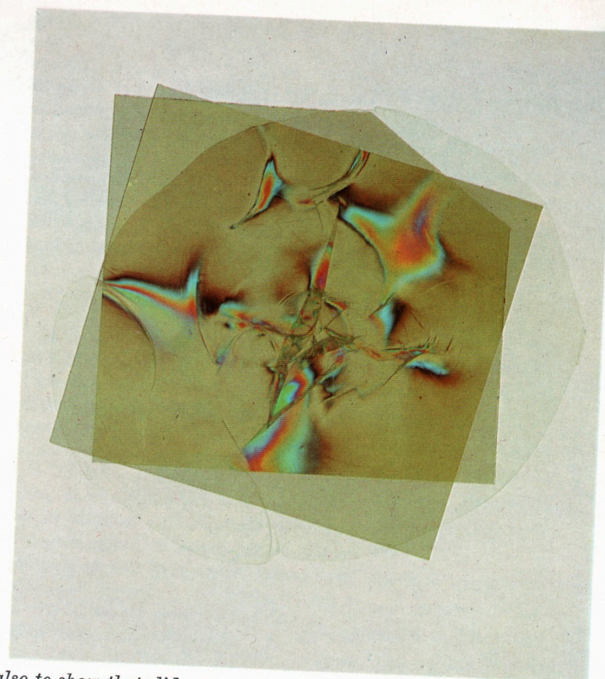
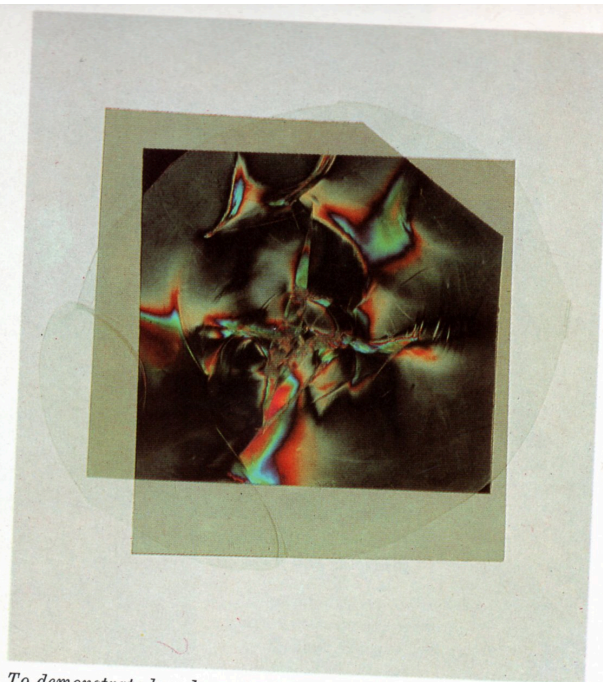
In the course of exploring positive and negative space with strong lighting directed on his static, cast metal sculptures, Harold Tovish (b. 1921, American) became attracted to the possibilities offered by an old, popular *trompe l'oeil* in the Boston Science Museum: a wine glass with coins in it turns out, when the coins are reached for, to be empty. The very convincing illusion of bitable nickels was achieved with a hidden system of parabolic mirrors placed clamshell-fashion at proper focal length, a light source and the coins themselves, also hidden. Tovish applied the technique to several works; in one called *Eclipse*, a human face mask appears very plastically outside the opening of a large black box. A hand reaching to touch the sculpture grasps air.

A band of young Russian artists, who call themselves the Dvizdjenje (movement) group, are also using electric light, in their case in conjunction with sound and odors in neo-constructivist metal and plastic sculptures. Little is really known of these kinetic objects. In Moscow and Leningrad they are exhibited in the context of architects' clubs, and it was at one such club that the two photographs reproduced opposite were taken. Although the group had accepted an invitation, at the last moment it was unable to send works to the Eindhoven light exhibition.

Most of the sculptors so far discussed utilize light, whether in light-receiving or light-giving pieces, in connection with other materials, as one tool among several involved in achieving a total effect. There are other artists who, for a broad variety of reasons, make objects in which light (and the necessary accompanying electric equipment) is virtually the only material.

Five of these artists—Billy Apple (b. 1935, New Zealander, living in U.S.), Martial Raysse, Chryssa, Stephen Antonakos (b. 1926 in Greece, now American) and Victor Millonzi (b. 1916, American)—use neon piping, blown to their designs, as the material for vari-colored sculptures which are in some cases timed to go on and off and which in other cases give off non-changing, discreetly trembling light. With differing degrees of success they hide the complex transformers that must accompany neon lighting, frequently housing the cumbersome parts in bases. ("Neon light" is really a popular term. In fact various gases of a certain related type, neon among them, flow through the pipes one knows best from the Times Square universe.)

To make what he terms "image-objects" and what others today might describe as assisted ready-made primary structures, Dan Flavin (b. 1933, American) uses white and colored fluorescent tubes of standard, commercially available width and varying lengths, in varied elemental straight-line arrangements.



To demonstrate how he makes his polaroid slides for projection, and also to show that slides are more portable than paintings or sculptures, Bruno Munari sent material for the illustrations shown above from Milan to New York in a half-ounce airmail envelope. He enclosed a piece of crushed colorless cellophane sandwiched between two polaroid filters. When the sandwich is held up to light, or projected, the cellophane provides the image, and the polaroid filters provide the colors. If the filters change position relative to each other, as shown here, the placement and intensity of the colors change.

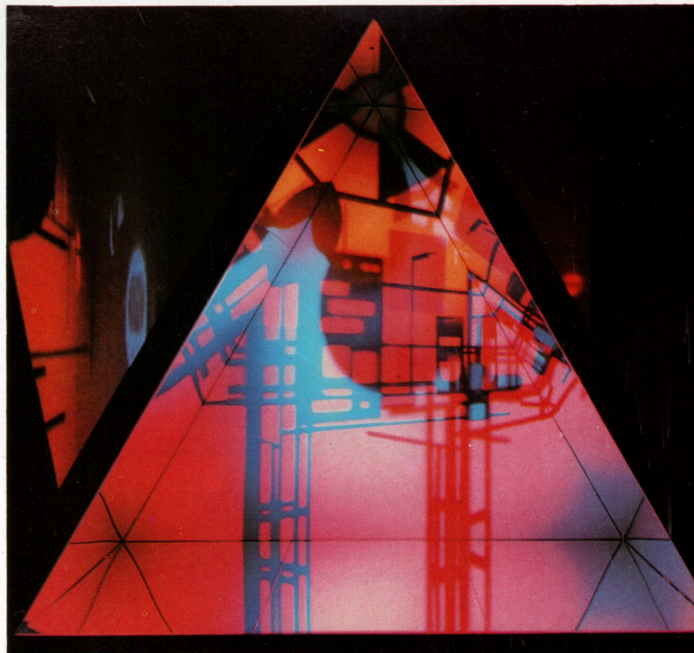
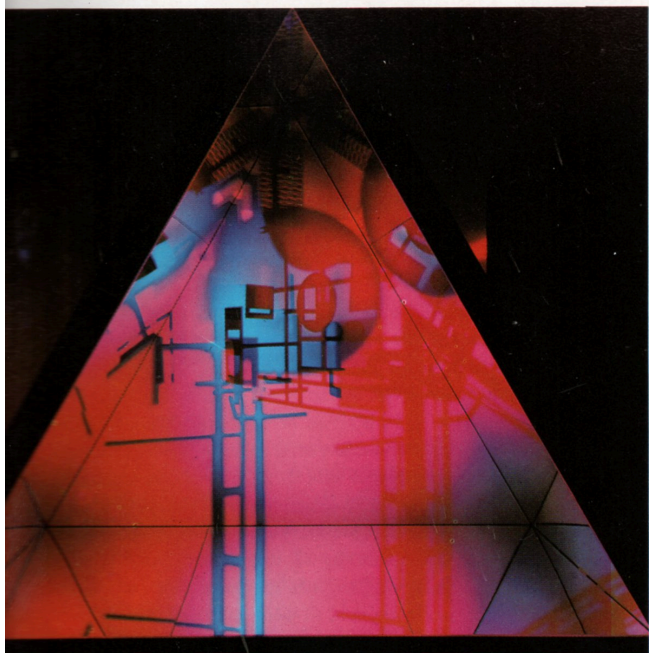
the Milan Triennale (the shapes bring to mind the famous time-exposed photographs that track Picasso's painting arm in motion). Nine years later, at a Turin commercial fair, Fontana filled the upper two-thirds of a 75-foot-high pavilion stairwell with horizontal bands of green neon, using over 6,000 feet of tubing. For the 1964 Triennale he designed a cigar-shaped room within a room, roughly 40 by 15 feet. One entered and stepped down onto a soft, yielding rug; the light was dim; the floor, ceiling and walls were burgundy red. Red light shone through breast-level perforations all around the room.

When Yves Klein (1928-1962, French) presented his "void"—an empty white room—as an event, or exhibition, in a Paris gallery in 1958, even some of his admirers found that, in contrast with Klein's aspiration to charge the vacant space with his artist's sensibility, the room looked more profane than sacred. When he repeated this "void" ("Venez avec moi dans le vide") in another small white room on the occasion of a 1961 retrospective at the Museum Haus Lange in Krefeld, Germany, he added white fluorescent tube light to the empty room. This time the room is said to have looked "special."

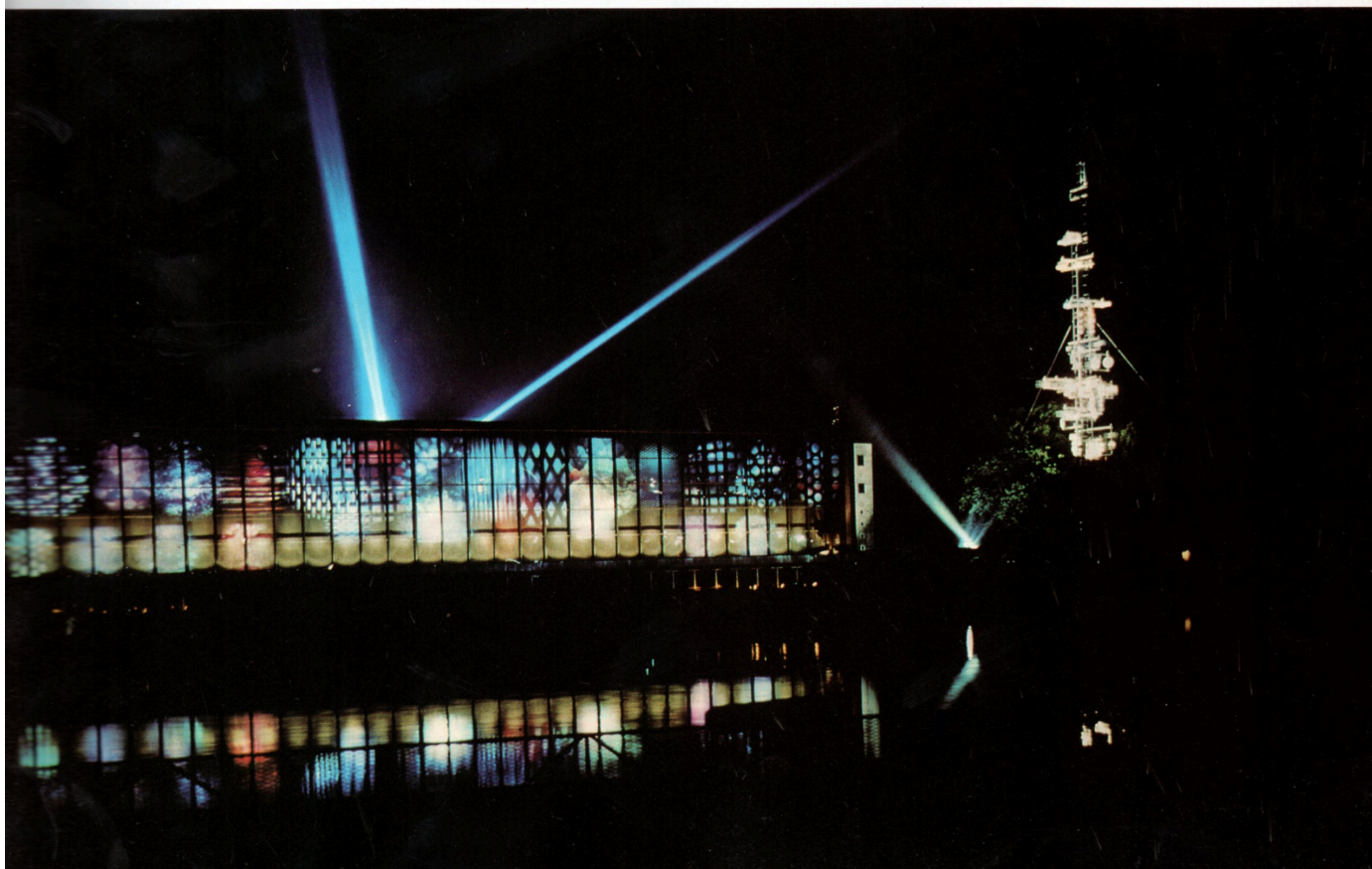
A related effect was created by Dan Flavin with "greens crossing greens" (to Piet Mondrian who lacked green), an environment made for the Eindhoven light exhibition last fall. Two crossing channels of green fluorescent tubes stood at different heights on series of evenly spaced green neon tube supports in an otherwise empty room. According to Flavin, the length of each channel was variable, restricted only by the bounds of the room's walls. Viewers with green eyes and green knees were barred from going past the crosspoint of the channels (unless they stooped low). Every centimeter of the room appeared intensely green.

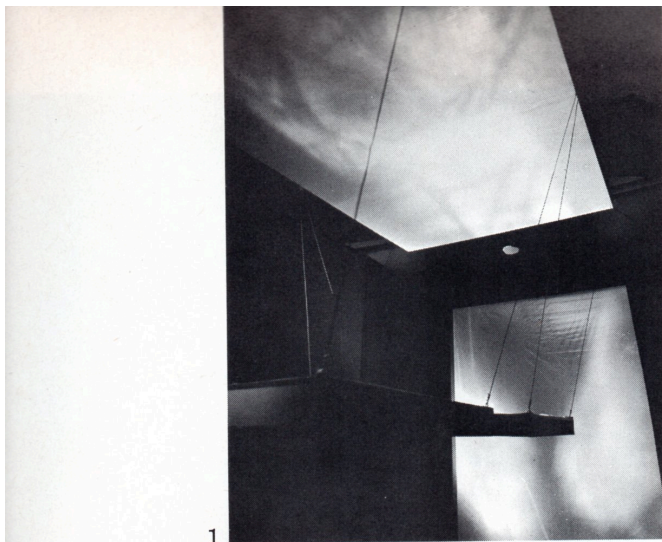
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Aided by the Philips electric equipment company and others, Nicholas Schoffer in 1961 designed "Form and Light," the modern son et lumière spectacle, opposite, for the glass-facaded Palais des Congrès on the banks of the Meuse river in Liège, Belgium. Inside the building projectors with color reflectors play on a translucent screen that rolls down behind the glass facade; these projections, controlled as to movement and form by an electronic keyboard, are reflected in the Meuse. At far right, Schoffer's "Cybernetic Tower," a giant version of his sculpture, rotates, reflects light from its polished aluminum parts and makes a kind of electronic music, partly according to impulses given its electronic brain by the surrounding atmosphere. On the roof are two Cremer reflectors with a 2,500 watt arc lamp. Photo courtesy the International Lighting Review, Amsterdam.

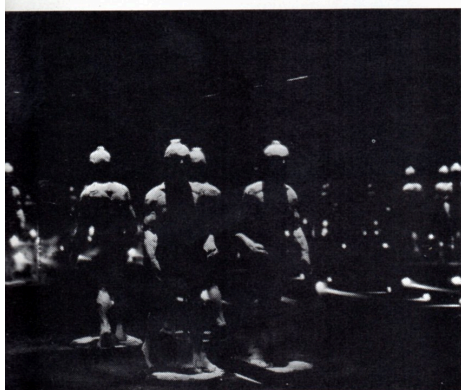


Nicholas Schoeffer: Lux II (at two different moments), 1957–66. A spotlight, motorized polished metal construction revolves behind the translucent screen of a man-high, mirror-walled, prism-shaped “look-in.” Galerie Denise René, Paris. Photos by Rolf Schroeter.



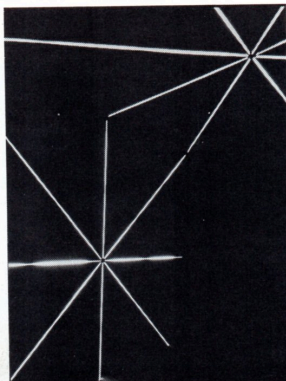


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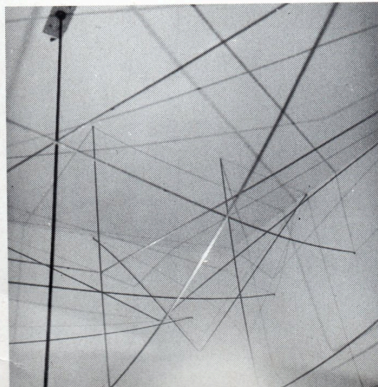


2

Room environments built for Kunst-Licht-Kunst exhibit, Stedelijk van Abbe Museum, Eindhoven, Holland, 1966: (1) Henk Peeters suspended bins of water which, when swayed, reflected movement in an overhead screen of light. (2) Davide Boriani mirrored all walls in a darkened room which the viewer activates by encountering step-on contacts that trigger colored overhead lights. In Quadrato Pulsante (3) Gianni Colombo programmed fluorescent light to flash through slits in darkened walls and ceiling. (4) Gabriele de Vecchi, in Strutturazione Virtuale, sent moving lines of shadow across a ceiling of bent metal rods with a revolving T-bar holding two lights. Photos by Manfred Tischer.



3



4

At the same exhibition, Henk Peeters (b. 1925, Dutch) contributed a black room with overhead hanging bins of water which, when swayed, caused a screened ceiling of lights to catch reflections of the water movement.

In contrast to these two open environments at Eindhoven and the Group Zero room there, in which a number of individual works were programmed in a sequence of spacious light phenomena, the Groupe de Recherche d'Art Visuel constructed a narrow and complex black labyrinth. There the viewer was confronted close-up at nearly every turn by flashing light activity housed in geometric, frontally viewed boxes. Virtually the only points of deaging, short of following the arrows out, were Le Parc's *Continuel-lumière* and his string-suspended inflated ball, which cast rapidly moving shadows in a white corner.

The environments constructed at Eindhoven by Italian members of Gruppo T were in a series of small, deliberately cubic rooms, open for entering and also visible from the outside through periscopes. Behind translucent slits in the four black walls and ceiling of one room, Gianni Colombo (b. 1937) installed horizontal, vertical and diagonal crossing lines of white fluorescent tubing; these flashed sequentially as the viewer made his way across a slightly pyramidal floor. The darkened room of Davide Boriani (b. 1936) was composed of four mirrored walls and a floor with haphazardly encountered step-on contacts that triggered colored overhead lights, permitting the viewer to play a kind of infinite chess with himself. Gabriele de Vecchi (b. 1938) sent moving lines of shadow across the ceiling of a white room with a rotating T-bar that contained two high-intensity lights shining up on a fixed web of bent rods.

Fire can be regarded as man's most archaic form of artificial or controlled light, and recently several artists have once again been attracted to its particular magic. One of these was Yves Klein, both in his plans for urban Edens, where living spaces were to be bounded by walls of fire, and in his *Wall of Fire* and *Fire Fountain*, made of flames neatly controlled by gas jets, which Klein had executed for his Krefeld exhibition. John Latham (b. 1926, English), who has used ultra-violet light in his book-filled environments to make the musty, secondhand pages glow, has also conducted a number of "ceremonies" in which he set aflame tall towers of carefully chosen, slightly dampened volumes of stored knowledge (encyclopedias, John Canaday's Metropolitan Museum of Art Seminar books, etc.).

A growing if not yet large number of artists are working with light projected over considerable distances. Obviously all film-makers are completely dependent on projected light to show their films, and certainly the intensity of light flickering on the screen is one of the reasons for the popular fascination with film and television. Only a handful of film-makers—even those whom one might for shorthand's sake call visually, as opposed to story, oriented—are especially concerned, in the course of making their films, with using light for anything other than lighting. Even fewer film-makers have experimented for artistic purposes with variations in projection technique, such as moving the projector while running it or projecting film with colored bulbs in the projector and so on.

For years commercial artists have simplified the enlarging of their designs for billboards and movie posters by projecting them; enlarging projectors are available in any reasonably well-stocked art supply store. One artist who for more than a decade has been exploiting the great changes in scale made possible by projection is Bruno Munari (b. 1907, Italian). Curious about the way so much of the world (transistor radios, tapes, microfilm, etc.) was becoming miniaturized, Munari thought about an art that might be carried or mailed easily. He began making

translucent collages, in the form of slides, using colored cellophane; scratched, burned and engraved textiles; chemical crystal formations; and other materials that, when applied to standard glass slides about two inches square, could be projected. In later slides Munari sandwiched colorless compositions of crumpled cellophane between two clear polaroid strips; when these were projected the polarization effect produced images of pure, rather than pigmented, color. Changing the position of one polaroid filter in relation to the other created images in which the composition of the picture, caused by the cellophane, remained the same, but the location of the colors and their intensity changed. Slowly rotating one of the two filters in front of the projector caused the images to change color before the viewers' eyes. Usually Munari shows his slides in theaterlike situations to gathered audiences, sometimes to the accompaniment of electronic music. (Munari and other artists also exploit the polarization process in light boxes and other frontally viewed objects. Marcello Salvadori—b. 1928, Italian—has made an appealing piece in which a small transparent plastic circle rotates between two much larger superimposed circles of polaroid that move slowly in opposite directions. The effect, in this case colorless, was to make both small and large circles change from clear to opaquely dark in a series of continuing eclipses.)

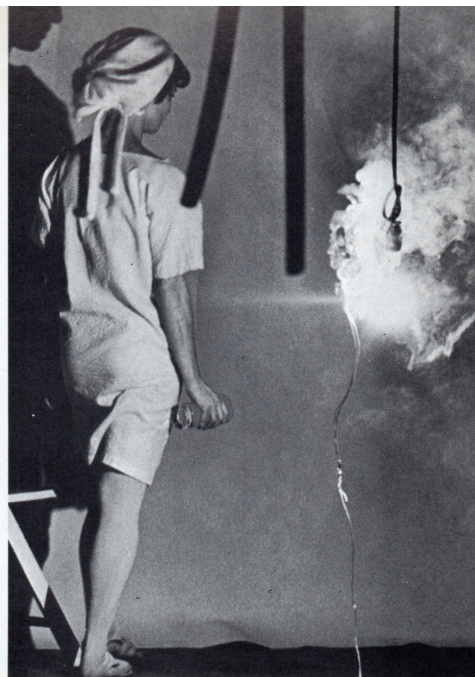
Several artists today are making their own slides for projection. Aldo Tambellini (b. 1930, American) uses translucent paint and inks on glass to produce centered abstract images. Marian Zazeela (b. 1940, American) transfers abstract calligraphic drawings onto black-and-white photo transparencies and then sandwiches layers of green and red theatrical gel under glass with the photos.

As mere projected pictures, slides are very adaptable in that they can be carried around easily and can be greatly changed in scale simply by adjusting the distance between projector and projecting surface. Slides are also adaptable in relation to time. That is, series of slides can be shown at whatever pace the artist wants—in quick rhythm, slow rhythm, varying rhythms. The idea of sequences of slides naturally brings to mind film. One difference between the two from the artist's point of view (quite aside from the fact that slides are cheaper and technically simpler to produce) is that, once made, both the speed and the order in which the slides appear can be regulated at will.

Just as cheaper, easier-to-operate movie cameras have encouraged the growth of the underground film movement, the Kodak Carousel projector and its imitators have encouraged artists to work with projected slides. These projectors, with their circular slide trays, can project eighty or one hundred slides over and over again, automatically, without a projectionist, and regular time intervals between slides can be predetermined by the artist.

Some artists project abstract picture images on distant walls with image sources other than slides. One uses perpendicularly crossing celluloid strips that have colored and scratched designs, the image depending on where the two moving strips cross. Manfred Kage (German) projects through several colored liquids and crystals that are constantly moving and changing in a chemical mixer he devised for the purpose. Jackie Cassen (b. 1938, American) and Rudi Stern (b. 1937, American) project through glass containers filled with water, oil and marbles.

Some artists employing projected images are concerned not so much with one picture but with the various effects of multiplication. In one simple form, multiplication is a matter of using several projectors to direct several different slides or images simultaneously or at overlapping times in one general direction and onto different areas of a single two-dimensional plane, as



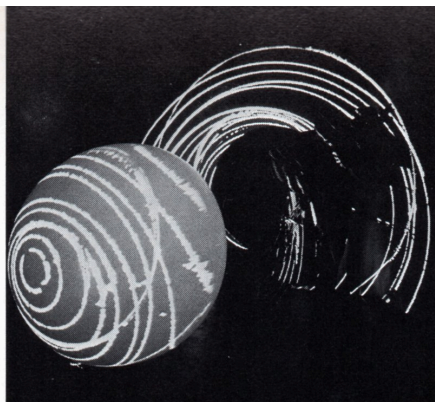
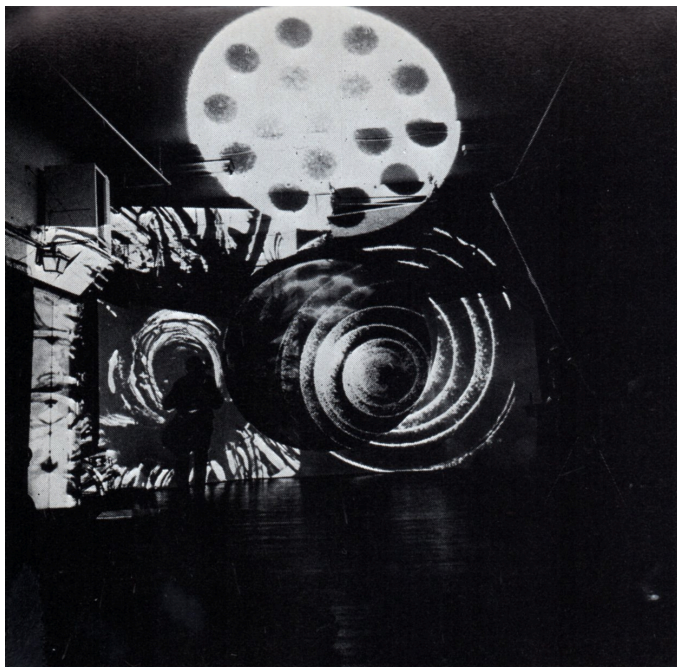
At this moment in Robert Whitman's "Prune Flat," a 1966 performance with film and human actors at the Film-Makers' Cinemathèque, New York, a bare lighted bulb is suddenly and deliberately crashed, and its filament fizzles briefly. Photo by Peter Moore.



In John Latham's April 1966 "Skoob Tower Ceremony" at Bangor University in Wales, a pillar of seven stacks of encyclopedias was burned to the accompaniment of a Welsh choir.



Yves Klein's Fire Fountain, a gas jet, fed from underground, at the Museum Haus Lange, Krefeld, Germany, 1961. Photo by Bernward Wember.



During these moments in "Black Zero," a mixed media performance conceived by Aldo Tambellini and performed at the Bridge Theater, New York, in 1966, slides painted by Tambellini are projected in rhythmical sequence onto an expanding weather balloon. The sound of the balloon pump and of a cello played onstage by Calo Scott are highly amplified. Photos by George Ehrlich.

Tambellini, Zazeela and the USCO group have done. Or it might consist of superimposing two or more projections on one two-dimensional plane, as Tambellini, USCO and the Cassen-Stern team have done.

It might be noted here that these sorts of projections, as well as those discussed below, which multiply to occupy varying, many or all planes in a room, exist in essentially theatrical situations. Usually the room is darkened; there is a beginning and an end (although often these are not clearly defined and occur simply for practical reasons, such as the technicians' exhaustion); there is a temporary audience; and, often, human participants are involved in ways beyond technical requirements. Even the perpetual slide-and-light play of this type that goes on in discotheques (a form of applied art reminiscent of the revolving, faceted mirror globes in nightclubs of the 1920s) is a kind of theater—only instead of dancing between cabaret acts, the customers become part of the act.

In the mostly, but not entirely, non-literary theater of mixed means that has been gathering force since the mid-1950s, light projections in the form of images from slides and film and, occasionally, projections of pure light, as well as other light devices, have been used a great deal. The degree of emphasis on light itself—as opposed to sound, the content of a film, human body movement and activity from other physical elements onstage—varies hugely. To take just a few examples, films have been projected on all surfaces of a room during a music-dance-poetry reading concert (John Cage); films have synchronized with human action on stage (Robert Whitman, Roberts Blossom); lights have flashed and slides have been projected during happenings (Allan Kaprow); the human body has been used as a current conductor to generate light and turtles' backs used to carry flashlights (Robert Rauschenberg). In La Monte Young's Theater of Eternal Sound, slides by his wife, Marian Zazeela, are projected during concerts of barely changing, highly amplified sound.

In these various cases, and others, light played an active but not dominant role in the performances.

Young's wish for his Eternal Sound theater is that its "music may play without stopping for thousands of years." Several artists working with light have related proposals for places where individuals may drop in at any hour of any day or night in order to look and/or listen. Such places would be theaters of "continuous showings," but they share with art objects an intention to be permanent rather than primarily entertaining.

One film-maker who has actually built a theater in his backyard is Stan Vanderbeek (b. 1931, American). Called the "Movie-Drome," it is semi-spherical in shape, and inside, films (Vanderbeek's animations and collages of stock newsreel footage), moving slides and roving spotlights project simultaneously onto the entire surface, accompanied by appropriately realistic sound snatches and, sometimes, by dancers. The audience lies on the floor, feet centered. It is Vanderbeek's proposal that such audio-visual chambers be located all over the world, sending pictures to each other via satellite for on-the-spot presentation by artists-in-residence. The perpetual aspect of Vanderbeek's world-wide Movie-Drome system suggests a kinship with existing audio-visual media such as television (which is in fact an almost perpetual theater). The Movie-Drome itself is pertinent to light art because of its semi-spherical shape, which provides a cornerless, all-over equal plane for projections.

Milton Cohen (b. 1924, American), leader of the ONCE group, a mixed means theater troupe centered at the University of Michigan, has created his own architectural space for a theater (in his former painting studio) where light projections are the dominant activity. The projections are in the form of black-and-white "found" film, black-and-white films made by Cohen, color slides and independent projections of pure light forms, accented by light-triggered electronic sound and the human gestures of a dancer and the projectionist (always Cohen himself). The



Exterior view of Stan Vanderbeek's Movie-Drome at Stony Point, New York.

projections go onto a complex system of triangular canvas panels and small rectangular moving screens that point in various directions like crossroad signs. These are situated around the room, for multidirectional viewing, and the dimensions of the room are further distorted by sending the projections through space with sets of mirrors and prisms.

USCO, an American group whose fluctuating number of members range in original profession from painters and weavers to poets and sound engineers, has built a hexagonal tabernacle domed by an orange-and-white parachute at its communal home, a former Protestant church in Garnerville, New York. There, open to the public every Sunday, can usually be found simultaneous projections of slides with abstract images, slides of Brueghel and Bosch paintings, slides of roadside slogans and split-screen films shot from a moving motorcycle. These are projected downward, through the parachute silk, to the accompaniment of roving amplified sound emerging from twelve speakers set around the six-sided room. In the center of the room, light projects through perforations in a large revolving aluminum column onto six paintings on the walls. At the base of the column, water sprinkles and incense burns. USCO's roadshow, "We Are All One," played facing the audience as in a traditional theater, utilizes roughly the same elements, with the addition of strobe lights, an oscilloscope zigzagging according to the sound and a robed figure in Buddha position. One of USCO's intentions is to provide a drugless "trip," that is, to simulate the light visions experienced by people taking hallucinatory drugs. Another intention is to use light to provoke for viewers the kind of mystical experience that is reported in the literature of most religions. USCO's tabernacle is, in fact, incorporated as a religious institution under New York state law, and the group will provide sanctuary (bed and board) for one family for a period up to a week. It has also provided sets of slides for multiwall projection in nightclubs.

(continued on page 46)

Stan Vanderbeek's "Movie Mural No. 2," a prototype performance for his proposed worldwide Movie-Drome system, consists of projections from 8 and 16 mm color, gel-covered, loop-projected films, filmstrips, slides and spotlights.



Andy Warhol's electronic rock-and-roll combo, The Velvet Underground, performing at the Exploding Plastic Inevitable nightclub in New York, June 1966. Films of combo members and close-ups of faces, plus changing color slides with allover designs by Jackie Cassen, were projected simultaneously onto four walls and ceiling while customers danced.



During a concert of La Monte Young's "7" at Larry Poons' studio in New York, in 1966, slides designed by Marian Zazeela were projected from two different machines onto the performers. Photo by Steve Shapiro.



Why Light?

"Light is measured by its capacity to produce a sensation."

—*Encyclopedia Britannica.*

The difference between Times Square and neon sculpture, which rely on the same technology, is not unlike the difference between the countryside and a landscape painting. The artist who uses light is pointing out certain phenomena and working them into a scale and context that is digestible. Like any other artist, he gears phenomena to the human organism by filtering them through his imagination and then expressing them with form, shape, color, scale and so on.

Light has certain qualities that attract artists, and one of these qualities is energy. Many light works exploit this quality in order to almost literally charge the viewer, that is, in order to emphasize the physical aspect of seeing. It can be argued that the everyday environment is an ever-accelerating chaos of sensations, and that to compete with it, on its own intensity level so to speak, is primitive, crude or even inhuman. Possibly, however, what artists do when they exploit the energy quality of light is encourage the development of sensitivities that can face bombarding phenomena from the real environment on a level of both toughness and subtlety. In other words, they remake the sense of sight.

The energy quality of light can also produce sheer fun, the fun of strong sensations, related to those experienced at sports events, or on a roller coaster ride—producing an "afterimage" of exhilaration. In these cases, the energy of light is usually applied in highly intense dosages, but it can also be used to express nuance, delicacy and something very close to silence.

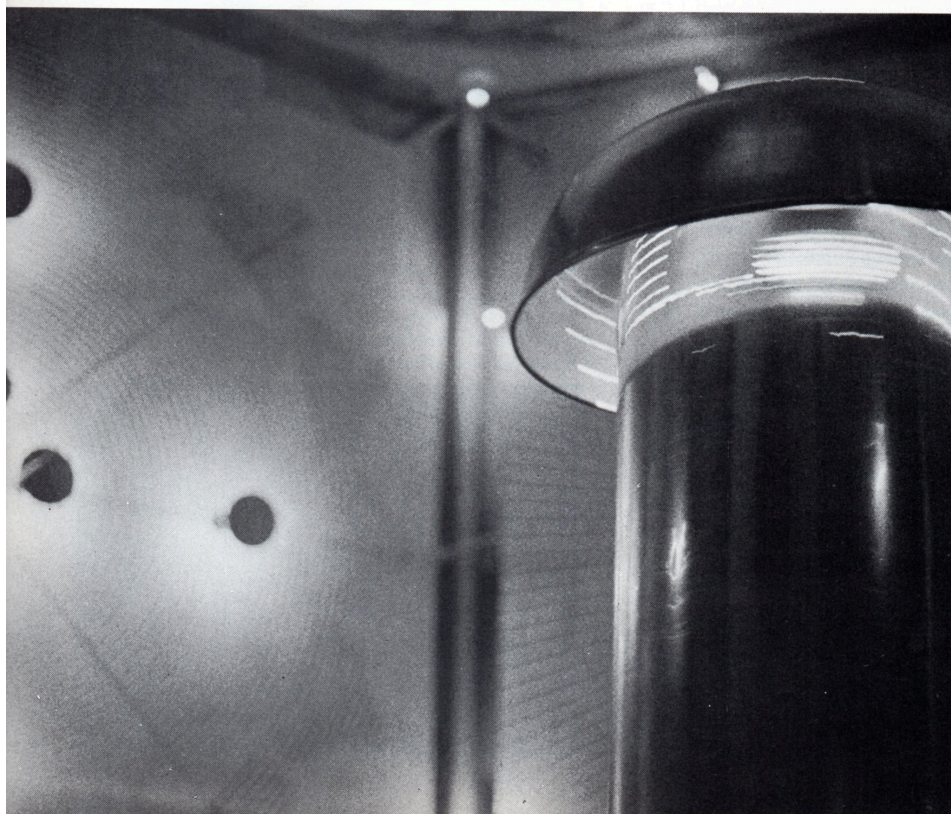
Another of light's qualities exploited in art works is its capacity to expand. One small bulb in a room fills, or at the

least, affects, the entire space. The largest measure of dimension so far invented by man is expressed by light, the light-year. Beams of artificial light can travel great distances; an artist may use them to express the miles traveled in airplanes or to alert people to the distances they will soon experience on moonflights.

Really powerful light beams, which several artists would like to use and virtually none has been able to obtain so far for reasons of cost, can be used to create works of enormous scale. Creating on a monumental scale for public places rather than living rooms or even museums is desirable again today to artists working in various media. As Chinese baby boom statistics are bruited about daily, it is not illogical that some artists are attracted to a tool that can be fashioned into works seen by vast numbers from vast distances.

The speed of light is still the greatest possible speed man has uncovered in the universe. The relationship between light and movement has already been exploited by many artists. As discussed, a prosaic form of movement—easy portability—occurs in the case of films and slides, which cannot exist as art until they are projected. Natural forms of light in movement include the flicker of firelight, the slight vibration of neon and the suggestion of current racing through the filament of an incandescent bulb. Quite apart from these phenomena, artificial light, because it can be turned on and off and in fact usually relies on electric current, lends itself particularly well to being timed or programmed. Timed light works, like any kinetic art, exist in four dimensions. Some artists use light primarily as a tool for expressing movement—any kind of movement, from jumpy to fluid. Others move lights for kicks, that is, in order to exaggerate the energy quality of light by repeating its initial impact.

Another property of light that attracts artists is its imma-



In the center of the USCO tabernacle, left, in Garnerville, New York, light projects through a revolving aluminum column onto the six walls.

In this 1965 performance, opposite, of Milton Cohen's "Hexes" at his "Space Theater" loft in Ann Arbor, Michigan, there were projections of slides with literal and abstract images, pure light forms and a film Cohen made of a moving sculpture with flapping panels. The slide images were trajected around the room space with mirrors and prisms, while the film ran on a "screen" of moving rectangular panels that was similar in appearance to the sculpture in the film. Visible here is a web of triangular canvas panels Cohen used as slide projection screens in order to break up the traditional room space. The movements of a dancer and the projectionist plus electronic sounds activated by the light projections added to the total effect. Photo by Gretchen Lambert.

teriality. Although its containers (bulbs, pipes, tubes) and its various parts (filaments, gases, transformers) weigh something, light itself does not. When light is uncontained, as in projections, reflections and refractions, you can see it but you can't touch it. (Sometimes, when light is strong, it is warm and therefore touches you.) That light is visible but intangible partly accounts for its magic, and in religious art, light has often been the symbol for immaterial beings such as gods, saints and angels.

The use of light as a medium in art is still in an early stage of development, as evidenced by frequent breakdowns in light machines or lengthy (and to many audiences, maddening) pauses in light-oriented performances. This does not mean that what has been done so far is uninteresting or of lower quality than what may appear in the future. Quite the contrary. The archaic period of an art form is the period in which trials and progress generate excitement and reflect a general cultural reorientation.

Like all the alliances art is arranging with technology, including the one music has arranged with electronically produced sound, the use of artificial light as a medium has been called dehumanizing and gimmicky. But even a superficial look at the artists' works and intentions reveals a concern with communicating to a greater number of people (often, quite literally, masses of people) than artists of the recent past have concerned themselves with reaching. The fact that light, like amplified sound, can be offered to many people at once is one reason why artists have turned to it. Most artists assume that a mass of people will have the same proportion of truly sensitive responders as a group of collectors has true connoisseurs.

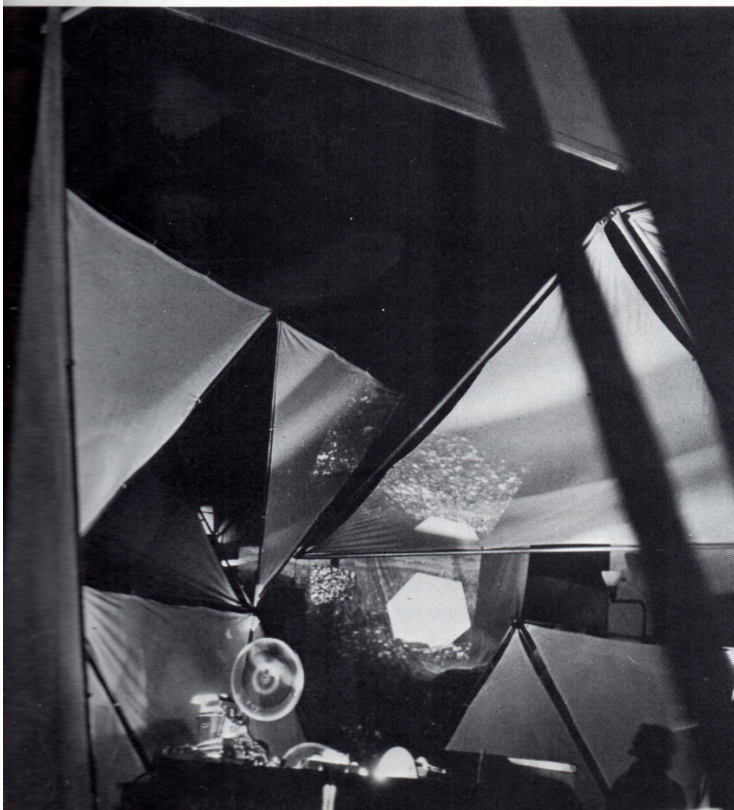
The assumption, by people who regard technology in art to be necessarily dehumanizing, that artists are falling blindly into step with the brave new information-theory world, seems, at the least,

prejudiced and ignorant of art history. The one constant attribute of artists is that they do the unexpected. That they do it with the tools of their century seems as natural as drinking wine in a vineyard.

Some light art is gimmicky. Some of the gimmicks are simply analogous to the second-rate painting that springs up around a vital painter's presented ideas. Other appearances seem gimmicky because even an engineer (as opposed to the proverbial monkey or "my child") could do it. Some engineers have done it, and the results, compared with the work of a number of light artists, are more or less on the monkey level. The public, including critics, will have to learn enough about modern technology to distinguish between tricks and artistic expression. The artist is still dealing with something far more mysterious than a mere technical invention. Technology only becomes attractive to him when he needs it for expressive purposes.

So far, technology suitable to the artists' conceptions has not always been available in ideal forms: for one thing, it is often very expensive, for another it may not yet be invented. For example, some artists have written of a desire to make immaterial sculptures—sculptures of no weight, "spirits" that might be walked through—years before advanced scientific work on holograms (the three-dimensional images produced with lasers) showed that such immaterial sculptures might be realizable with something more controllable than puffs of smoke.

Destroying conventions of the past has been a vital part of the history of modern art to date. The use of light as a medium may be a case of a new convention coming into being. The period in which this medium is most of the message is still operating. But there are artists who try to work the medium as a message into a message that is more than the medium.



In "Night Train," below, played in early 1967 by the ONCE group at Brandeis University theater in Waltham, Massachusetts, five compositions on themes of seeing, doing, hearing, feeling and story-telling ran simultaneously onstage and through the audience area. Harold Borkin's seeing theme was portrayed with light—by filling a specific circular patch onstage with an extremely intense pool of spotlighting and by dressing three performers in silver vinyl reflecting costumes. The intense light onstage contrasted with the dim lighting in the audience section. Photo by Peter Moore.

